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PHOTOLYTIC DESTRUCTION TECHNOLOGY DEMONSTRATION - FINAL REPORT NAS NORTH ISLAND, SITE 9

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The Photolytic Destruction Technology was chosen for demonstration, as part of the Navy Environmental Leadership Program (NELP), at Naval Air Station (NAS) North Island's Site 9 soil vapor extraction (SVE) system. The demonstration was conducted, under contract N47408-97-C-0215 through Naval Facilities Engineering Service Center's Broad Agency Announcement (BAA) program, to Process Technologies Incorporated (PTI), beginning October 7, 1997 and ending February 12, 1998, for 128 days. The literature search, demonstration oversight, and evaluation were funded by the Pollution Abatement Ashore Program managed by Naval Facilities Engineering Command and sponsored by the Environmental Protection, Safety and Occupational Health Division (N45) of the Chief of Naval Operations. The system was installed to treat a slip stream containing volatile organic compounds (VOCs) from the operating SVE system already installed at the site. The goal of this demonstration was to obtain the necessary cost and performance data, including the lessons learned, on the system comprising of a concentrator, condenser, and photolytic destruction unit (PDU), for comparison with other treatment technologies.

The system was demonstrated on air stream contaminated with halogenated and non-halogenated VOCs such as 1,2-dichloroethene, trichloroethene, tetrachloroethene, toluene, and octane. The test results indicated that the system was effective in removing VOCs in the SVE off-gas to below the maximum allowable emissions of 25 parts per million by volume. The average total DRE achieved for VOCs was 95.44% whereas the PDU alone demonstrated an overall DRE of 97%. The estimated unit cost to treat SVE off-gas at NAS North Island's Site 9, for a 3,000 standard cubic feet per minutePTI system, is $3.77 per pound of VOC treated.

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Executive Summary

The Photolytic Destruction Technology was chosen for demonstration, as part of the Navy Environmental Leadership Program (NELP), at Naval Air Station (NAS) North Island's Site 9 soil vapor extraction (SVE) system. The demonstration at the site was conducted, under contract N47408-97-C-0215 through the Naval Facilities Engineering Service Center's Broad Agency Announcement (BAA) program, to Process Technologies Incorporated (PTI), during 7 October 1997 through 12 February 1998, for a total of 128 days. The literature search, demonstration oversight, and evaluation were funded by the Pollution Abatement Ashore Program managed by the Naval Facilities Engineering Command and sponsored by the Environmental Protection, Safety, and Occupational Health Division (N45) of the Chief of Naval Operations. The system was installed to treat a slip stream containing volatile organic compounds (VOCs) from the operating soil vapor extraction (SVE) system already installed on site. The goal of this demonstration was to obtain the necessary cost and performance data on the PTI system and make a comparison to other treatment technologies demonstrated at the site. The objectives of the PTI demonstration include the following:

- Determine the total average destruction and removal efficiency (DRE) achieved by the PTI system for all VOCs measured in the SVE off-gas, as well as individual DREs for critical VOCs.

- Develop treatment cost data for a 3,000 standard cubic feet per minute (scfm) PTI system, designed to achieve the DREs measured above, for VOC-contaminated soil vapor similar to those at Site 9.

- Characterize and quantify secondary waste streams generated by the PTI system at Site 9 and determine the appropriate disposal option(s) for each. Estimate the costs of disposal of all secondary waste streams generated.

- Characterize and quantify all residuals, including hydrochloric acid, chlorine, phosgene, carbon monoxide and dioxins, exiting the PTI system.

- Document observed operating problems and their solutions.

- Disseminate the results of the demonstration throughout the Department of Defense (DoD), the Department of Energy (DOE), private industry, state regulatory agencies and the NAS North Island Restoration Advisory Board (RAB).

The compounds that were treated in the PTI system include halogenated and non-halogenated VOCs such as 1,2-dichloroethene, trichloroethene, tetrachloroethene, toluene, and octane.

The PTI system was successful in removing VOCs in the SVE off-gas to below the maximum allowable emissions of 25 parts per million by volume (ppmv). The average total destruction and removal efficiency (DRE) for VOCs was 95%. The Photolytic Destruction Unit (PDU) alone achieved an overall DRE of 97%.

The estimated unit cost to treat the SVE off-gas at NAS North Island's Site 9, in a 3,000 standard cubic feet per minute (scfm) system, is $3.77 per pound (lb.) of VOC treated.

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Acronyms and Abbreviations

bgs	below grade surface
C_3-C_{12}	Hydrocarbons chemicals containing 3 to 12 carbon atoms per molecules
CARB	California Air Resources Board
Catox	Catalytic Oxidizer
cfm	cubic feet per minute
CO	Carbon monoxide
COTR	Contract Officer's Technical Representative
DCE	Dichloroethylene
DoD	Department of Defense
DOE	Department of Energy
DRE	Destruction Removal Efficiency
EPA	United States Environmental Protection Agency
FID	Flame Ionization Detector
HCl	Hydrochloric acid
hr	hour
IR	Installation Restoration
IWTP	Industrial Waste Treatment Plant
kW	Kilowatts
lb.	pound
lbs/hr	pounds per hour
LEL	Lower Explosive Limit
NELP	Navy Environmental Leadership Program
NAS	Naval Air Station
NAVFACCO	Naval Facilities Contracts Office
NFESC	Naval Facilities Engineering Service Center
nm	nanometers
NTCRA	Non-Time Critical Removal Action
NWC	Naval Weapons Center
O_3	Ozone
OHM	OHM Remediation Services Corporation
PCB	Polychlorinated biphenyl
PCE	Perchloroethylene or tetrachloroethylene
PDU	Photolytic Destruction Unit
PLC	Programmable Logic Control
ppbv	parts per billion by volume
ppmc	parts per million as carbon

ppmv	parts per million by volume
PRG	Preliminary Remediation Goals
psia	pounds per square inch absolute pressure
psig	pounds per square inch gauge pressure
PTI	Process Technologies Incorporated
QA/QC	Quality Assurance /Quality Control
QAPP	Quality Assurance Project Plan
RAB	Restoration Advisory Board
scfm	Standard cubic feet per minute (@60°F and 14.69 psia)
SOP	Standard Operating Procedure
SVE	Soil Vapor Extraction
SVE&T	Soil Vapor Extraction & Treatment
SVOC	Semi-volatile organic compound
SWDIV	Southwest Division, Naval Facilities Engineering Command
TCE	Trichloroethylene
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TNMOC	Total non-methane organic compounds
TSS	Total Suspended Solids
TO-#	EPA Standard Sampling or Analytical Test Method for gas samples
UV	ultraviolet
VOC	volatile organic compound
VPAC	Vapor Phase Activated Carbon
Work Plan	"*Process Technologies Incorporated Technology Demonstration Final Work Plan*"
$/lb.	cost per pound
°F	degrees Fahrenheit
"	inch or inches

INTRODUCTION

1.1 Demonstration Program Background

In July 1996, the Navy Environmental Leadership Program (NELP) issued a Broad Agency Announcement (BAA), Solicitation N47408-96-R-6342, for demonstrating a remediation technology for environmental cleanup. The Navy's goal in issuing this BAA was to demonstrate innovative technologies that are at the advanced development stage and are ready for field implementation. Process Technologies' Incorporated (PTI) responded to the BAA, which resulted in the selection of their Photolytic Destruction Technology for demonstration at Naval Air Station (NAS) North Island Installation Restoration (IR) Site 9. The goal of the demonstration was to obtain the necessary cost and performance data on the PTI system demonstration at NAS North Island, Site 9, and make a comparison with other commercially-available treatment technologies. This data will be compiled by the Naval Facilities Engineering Service Center (NFESC) and provided in a summary report to be distributed within all of the Department of Defense (DoD). The two potential benefits to PTI are potential immediate full-scale implementation at NAS North Island and potential future use within the federal government at other sites with similar volatile organic compound (VOC) air streams requiring treatment.

1.2 Site Description

Location

NAS North Island is located in southern San Diego County, across San Diego Bay from the downtown area, on the northern end of Coronado. Twelve sites on NAS North Island were identified as IR sites owing to their historical use as hazardous materials generating and/or disposal sites. Site 9 is one of these IR sites.

For this demonstration, the PTI System was installed to interface with an existing Soil Vapor Extraction and Treatment System (SVE&T). The SVE&T was installed at Site 9 in 1997, to remove and treat the contaminated soil vapor from Site 9's Area 1 and 3 SVE wells. PTI treated soil vapor from the Area 3 wells only. Figure 1-1 presents the PTI System Locating Plan indicating the location of the PTI System as it relates to SVE&T the facility.

Geology

The uppermost layer at Site 9 consists of approximately 100 feet of poorly graded fine sand and silty sand with shell beds. Several layers of clay, clayey sand and silt exist from approximately 35 feet below grade surface (bgs) to 150 feet bgs. The character of the vadose zone, which is 8 to 10 feet thick, is suitable for soil vapor

extraction (SVE). The shallow nature of the vadose zone at Site 9 required installation of horizontal SVE wells to effectively capture VOCs in the vadose zone (OHM Remediation Services Corp. (OHM)1996).

Chemicals of Concern

Five VOCs were found in vadose zone soil at Site 9 in concentrations that exceed the United States Environmental Protection Agency (EPA) Region IX Industrial Preliminary Remediation Goals (PRGs). These are cis-1,2-dichloroethylene (DCE), 1,1-DCE, tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride (OHM 1996). For the demonstration, compounds known to exist at concentrations >2ppmv were also added to this list.

Table 1-1: Chemicals of Concern

Chemical Name	Concentration in SVE Vapor[1]
Octane[2]	96.44
Tetrachloroethene	31.40
Trichloroethene	27.60
cis-1,2-Dichloroethene	22.20
Toluene	14.20
1,1-Dichloroethene	N.D.
Vinyl Chloride	N.D.

Notes:
1. Average SVE vapor concentration, as measured during Steady-State Operations, by EPA Method TO-14.
2. The concentration of Octane was calculated using the equation: $\text{Concentration}_{\text{Octane}}$ = [(Total Vapor Concentration by FID) - (Total Vapor Concentration by TO-14) - (Methane Concentration)] ÷ 8.

Site History

Site 9, the Chemical Waste Disposal Area, includes a low-lying depressed area in the northeastern corner that was used for liquid chemical waste disposal beginning in the 1940s (OHM 1996). Disposal in this area was halted when it became apparent that mixing of wastes was generating chemical reactions that caused fires. Part of the depression was excavated and back-filled with clean, compacted fill for construction of the aircraft run-up pad and taxi-way in 1974. The remainder was filled in with soil and concrete rubble in 1978 (OHM 1996).

Beginning in 1968, wastes were segregated into four parallel trenches near the eastern edge of Site 9. The trenches received solvents, caustics, acids, and Sermetel W (a semi-synthetic high-temperature coating of ceramic and metallic compounds

consisting of metallic carbides). Disposal of wastes in the trenches ended in the mid-1970s when installation of an Industrial Waste Treatment Plant (IWTP) was completed. The southeast corner of Site 9, extending to the fence line which houses the Naval Weapons Center (NWC), was used intermittently for liquid waste disposal from the 1950s to 1978 (OHM 1996).

In general, VOCs, semi-volatile organic compounds (SVOCs), petroleum hydrocarbons, metals, and polychlorinated biphenyls (PCBs) have been detected in soils at the Site 9 disposal areas (OHM 1996).

Non-Time-Critical Removal Action (NTCRA)

Presently, a Non-Time-Critical Removal Action is in place at Site 9 to remove VOCs from vadose zone soil. The NTCRA work at Site 9 consists of the following, and is described in more detail in Section 2.3:

- Extraction of VOCs from soil by SVE. A series of horizontal SVE wells and air injection wells have been installed in Areas 1 and 3.
- Treatment of extracted soil vapor by vapor phase activated carbon adsorption.

1.3 Demonstration Objectives

This demonstration was performed to obtain the relevant data needed for Navy project managers, and other decision makers, to evaluate the PTI system's applicability for a project while reducing cost on the project. The PTI technology will be compared with all other emerging and commercially available technologies so remedial project managers (RPMs) can make the optimum business decisions for the Navy and other DoD.

The objectives of this demonstration were as follows:

1. Determine the total average DRE achieved by the PTI system for all VOCs measured in the SVE off-gas, as well as individual DREs for critical VOCs.

2. Develop treatment cost data for a 3,000 standard cubic feet per minute (scfm) PTI system, designed to achieve the DREs measured above, for VOC-contaminated soil vapor similar to those at Site 9.

3. Characterize and quantify secondary waste streams generated by the PTI system at Site 9 and determine the appropriate disposal option(s) for each. Estimate the costs of disposal of all secondary waste streams generated.

4. Characterize and quantify all residuals, including hydrochloric acid, chlorine, phosgene, carbon monoxide and dioxins, exiting the PTI system.

5. Document observed operating problems and their solutions.

6. Disseminate the results of the demonstration throughout the DoD, DOE, private industry, state regulatory agencies and the NAS North Island RAB.

2.0 Technology Description

PTI's VOC treatment system consists of a fluidized bed concentration unit and a photolytic destruction unit (PDU). The concentration unit produces a low flow, high concentration VOC vapor that is then processed through the PDU. For most treatment or recovery technologies, it is desirable for the unit to receive a low cubic feet per minute (cfm) flow with high levels of VOCs, rather than the high flow and dilute VOCs typically found. The concentration unit can pre-concentrate organics up to 1,000 times while correspondingly decreasing the cfm flow.

The concentration unit includes a chilled-water condenser to preferentially remove non-chlorinated hydrocarbons from the vent gas prior to treatment in the photolytic destruction unit. The PDU is most cost-effective when treating high concentration vapors containing chlorinated hydrocarbons. PTI has combined the two technologies to provide a system that can treat a variety of contaminated VOC vapor streams. Figure 2-1 is a simplified schematic diagram of the PTI System. A detailed description of the technology as it was demonstrated at Site 9 is presented below.

2.1 Concentration Unit

The Concentration Unit consists of three major components: an adsorber, desorber and condenser. A description of each component and its basic unit operations is discussed below:

<u>Adsorber</u>

The adsorber develops a fluidized bed of adsorbent beads to extract organic vapors from the SVE vapor. The adsorbent beads are specifically designed to extract VOCs from high humidity gas streams. The adsorber has multiple stages of adsorption trays to control the flow of adsorbent beads. As the beads flow from one tray to the next, they adsorb the VOCs from the gas stream, in a process referred to as "loading". Fluidization of the adsorbent media bed enhances the kinetics and improves the capture rate. On a static bed, a small break between carbon pieces will allow the gas flow to select the path of least resistance and much of the flow will pass without adsorption. The constant movement of the media allows for all portions of the adsorbent to be utilized.

The adsorber is operated under a slight negative pressure so that SVE vapors can be drawn into the adsorber. A manually operated flow control system is used to bring 250 scfm of SVE vapors into the unit. As noted earlier, the SVE flow rate is adjusted based on the actual VOC concentrations that are experienced during operation. Additional ambient air (trim air) is mixed with the SVE vapor before entering the adsorber. A manually operated flow control system is used to draw a minimum of 400 scfm of combined gas flow into the unit.

The combined gas flow moves upward through multiple stages of trays to contact the adsorbent media used to adsorb VOCs from the gas stream. The adsorbent beads flow downward through the unit (tray-to-tray) while the gas flows upward at sufficient velocity to fluidize each stage of adsorbent media. This allows intimate and thorough contact of the gas with the adsorbent. The treated gas passes through an internal screen prior to its return to the existing SVE piping at a point down-stream from the tie-in. The internal screen ensures that the adsorbent beads are retained within the adsorber.

<u>Desorber</u>

The Desorber evaporates the VOCs from the loaded adsorbent beads. High-pressure steam (60 psig) provides energy through a heat exchanger to desorb the organics from the adsorbent beads. A low pressure steam (atmospheric pressure) is used as the carrier vapor to sweep the desorbed organic vapors from the desorber. The desorbed "lean" adsorbent beads are then immediately recycled to the adsorber, to begin another cycle.

The "loaded" adsorbent beads are pneumatically transferred from the bottom of the adsorber to the top of the desorber. The adsorbent beads flow downward in a plug-flow manner. The desorber contains a steam-heated heat exchanger that warms the adsorbent to 300° F. This heat vaporizes the adsorbed VOCs. Low pressure, superheated steam is used to sweep the desorbed VOCs out of the desorber and into the condenser. The "lean" adsorbent is pneumatically recycled to the top of the adsorber for reuse. This provides for the continuous, closed-loop operation of the adsorbent beads through the concentrator system.

A small electrically-heated boiler was used to generate steam for the desorber and provide the low pressure sweep steam. Make-up water for the steam generator was provided from the existing SVE&T Steam Generating Skid, and boiler blowdown was drained to an existing wastewater sump located adjacent to the SVE&T Steam Generating Skid.

<u>Condenser</u>

The condenser is cooled with chilled water to preferentially remove the water vapor and non-halogenated organics in the concentrated sweep vapor. A portion of the

halogenated chemicals is also removed in the condenser. The condenser temperature can be controlled with a thermostat to achieve the desired condensing conditions. During the first few weeks of operation, evaluations were made to determine the preferred operating temperature for the condenser. A chilled water system is used for the condenser. Heat is rejected from the refrigeration unit using an air-cooled heat exchanger. Condensate was collected in a "day" tank and then transferred to the existing gravity separator located on the SVE&T wet-end skid. The day tank was sampled prior to transfer of the SVE&T gravity separator.

2.2 Photolytic Destruction Unit (PDU)

The PDU, located between the condenser and the recycle line to the adsorber, processes the non-condensable vapors from the condenser. The PDU consists of tow major components: the photolytic reactors and a wet scrubber. A description of each component and its basic unit operations is discussed below:

<u>Photolytic Reactors</u>

Two photolytic reactors, each capable of treating up to 5 scfm of concentrated, contaminated vapor were included with the system. Non-condensable vapors from the condenser flow into the PDU. The non-condensable vapors are mixed with ambient air prior to entering the PDU to control the vapors to less than 20% of the lower explosive limit (LEL) for the gas mixture. This adjustment is made manually, based on analytical test results.

The mixture of VOC-laden vapor and ambient air passes through the photolytic reactors, where the vapors are exposed to high levels of photons produced by ultraviolet (UV) lamps. The VOCs break into free radicals which react with the alkaline compounds contained in the reagent panels. This reaction works to prevent the formation of undesirable by-products in the process exhaust stream. The reagent panels are located adjacent to the UV lamps.

When the reagent panels are exhausted (fully utilized), acid gases from the reactors will be predominantly reacted in the Wet Scrubber system. The pH of the scrubber solution is reduced as high loadings of acid gas are processed. A rapid drop in the scrubber solution pH is an indicator that the reagent panels need to be replaced. During the demonstration, two sets of reagent panels were used. At the completion of the technology demonstration, the reagent panels were tested using the EPA Toxicity Characteristic Leaching Procedure (TCLP) to verify that the panels could be disposed as sanitary rather than hazardous waste.

To control the temperature inside the reactors, a closed-loop cooling water system provides cooling water to plate-type heat exchangers that are located between the reagent panels. Heat energy from the lamps, and heat of reaction from the neutralization reactions, are removed via the internal heat exchangers. The closed-

loop cooling system circulates the water from the heat exchangers through a radiator system where air rejects the heat to atmosphere. The cooling system has two pumps, one operating and one backup.

Wet Scrubber

The VOC-free gas from the photolytic reactors flows through a caustic scrubber system to remove any trace amounts of hydrogen chloride, or other acidic by-products that are not reacted with the reagent panels. The scrubbing system operates with a 5% caustic soda solution as the reagent. Two pumps are provided with the system, one operating and one backup.

The clean, scrubbed gas flows back to the inlet of the Concentration Unit. An emergency by-pass system is included so the cleaned and scrubbed gas can be processed through a canister of activated carbon prior to recycle to the adsorber outlet in the event that the Concentration Unit trips off-line.

Prior to disposal, the spent scrubber solution is pumped out of the scrubber recycle tank, through an activated carbon canister, and into a 55 gallon drum. Samples of the solution in the drum were analyzed for comparison with the site discharge permit requirements. This analysis proved the water could be drained into the site sanitary sewer system.

The PTI System is capable of being operated in three different process configurations. They are:

Configuration-1: Concentration-Condensation-Photolytic Destruction
Configuration-2: Concentration- Condensation
Configuration-3: Concentration- Photolytic Destruction

Each of these process flow configurations was evaluated during this technology demonstration. Refer to "*Process Technologies Incorporated Technology Demonstration Final Work Plan*" (Work Plan) for additional information regarding the process flow configurations that were evaluated.

2.3 PTI and SVE System Interface

For this demonstration, the PTI System was installed to interface with an existing SVE&T. The SVE&T was installed at Site 9 in 1997, to remove and treat the contaminated soil vapor. Figure 1-1 presents the PTI System Locating Plan indicating the location of the PTI System as it relates to the SVE&T facility.

The SVE vapor is drawn from the wells by SVE blowers located at the treatment facility. The SVE&T System is rated at 3,000 scfm of vapor flow. VOCs are removed from the SVE vapor using a regenerative vapor phase activated carbon

(VPAC) system. The SVE&T System consists of six equipment skids: the SVE System Skid, VPAC System Skid, Wet-End Skid, Steam Generating Skid, Injection Blower Skid, and Cooling Water Skid. The PTI System pulled SVE vapors from, and re-injected treated gas to, the SVE System Skid.

The PTI System used for this demonstration was designed to treat 500 scfm of SVE vapor, and to remove a minimum of 3.6 pounds per hour (lbs/hr) of VOCs. During the operation of the system it was determined that the maximum flow rate that could be treated was actually 440 scfm. As shown in Appendix C, the average composition of the SVE vapor from the Area 3 wells was calculated to be 191.84 ppmv of VOCs. This is equivalent to approximately 1.22 lbs/hr of VOCs at the 500 scfm design rate, which is approximately one-third the projected VOC removal capability of the PTI System used for this demonstration.

The SVE vapor was drawn from the Area 3 SVE piping from a nozzle located on the SVE well manifold piping. OHM installed the manifold system, complete with a diversion valve and isolation block valves. Figure 2-1 identifies the approximate tie-in point, and schematically shows the major process operations associated with the PTI System. PTI installed a booster blower to draw the SVE vapors into the PTI System. The booster blower was equipped with an air/water separator to remove any free moisture from the SVE vapor. Water collected in the separator was drained to the existing OHM Wet End system.

After treatment through the PTI System, the treated gas was returned to the manifold piping for subsequent processing through the existing VPAC System. In addition to the booster blower, PTI also provided an auxiliary blower for the treated gas leaving the PTI system. This blower was used when the SVE&T blower systems were inoperative to allow the PTI technology to continue to operate.

2.4 Technology Applicability

Photolytic destruction has been demonstrated to destroy VOCs in SVE and chemical storage tank vents off-gas. Off-gas streams from air strippers, air spargers and process vent streams are other likely applications for the technology. Pilot and commercial-scale work has shown that photolytic destruction is best suited for destroying low-flow, high concentration gas streams containing halogenated VOCs. For the treatment of high flow, dilute gas streams, a concentrator is used as a pretreatment method, prior to destruction by photolytic destruction. The Concentration Unit has been installed and in use in Europe for the control of VOC emissions from paint spray booth and fiberglass reinforced plastics operations. This demonstration was the first commercial demonstration of the PDU and Concentration Unit in the United States.

2.5 Commercialization and Intellectual Property

The photolytic destruction technology is manufactured and sold as PDUs by PTI. The PDUs are protected by 5 U.S. and 2 international patents. The concentrator technology is manufactured and sold by PTI under license to MIAB, an air pollution control equipment manufacturer located in Mōlnbacka, Sweden.

2.6 Competing Technologies

The PTI system competes with conventional VOC treatment technologies such as activated carbon and flameless thermal oxidation.

2.7 Technology Maturity

Photolytic destruction is an innovative air treatment technology, although variations have been applied for the treatment of contaminated water. The technology, together with the concentrator, is being implemented on a commercial scale for the treatment of air stripper off-gas and other SVE sites. The Concentration Unit has been in use in Europe since 1990.

3.0 Experience And Findings Of The Demonstration

Below is a summary table listing the order and dates of major events completed during the demonstration.

Table 3-1: Schedule of Project Activities

Activity	Date(s)
Contract Award	July 31, 1997
Kick-Off Meeting	August 15, 1997
Work Plan Development	August 16 - October 3, 1997
Mobilization	October 7-11, 1997
Installation	October 11, 1997
Startup	October 12 - October 18, 1997
Parametric Tests	October 24, 1997 - January 8, 1998
Steady-State Tests	January 17 - February 6, 1998
Demobilization	February 7 - February 12, 1998

3.1 PTI System Mobilization and Installation

Prior to initiating the on-site work, the PTI system was pre-assembled and tested to verify mechanical, electrical and instrumentation integrity. This testing was performed at PTI's facility in Boise, Idaho. The U.S. Navy's Project Manager and

Contracting Officer's Technical Representative (COTR) were on hand to witness a portion of the pre-mobilization testing.

Prior to mobilizing the PTI system to Site 9, PTI personnel together with assistance from OHM site personnel, performed various on-site mobilization activities. These activities were performed several days in advance of shipping the PTI System. They included:

- Preparation of an area of approximately 20' wide by 50' long to receive the PTI System, the Booster Blower and Auxiliary Blower Modules.

- Installation of tie-in connections for the field-run piping for the boiler feed water, SVE vapor inlet piping, treated vapor outlet piping, potable water, and condensate transfer piping. Since this was a temporary facility, piping runs were all above ground and were anchored onto cribbing supports. Walk-over stiles were placed where appropriate to prevent tripping hazards.

- Installation of conduit and wiring from an existing 480 volt, 200 amp electrical service, adjacent to the Injection Blower Skid, to the PTI System (see Figure 1-1).

The PTI equipment was delivered to the site, on October 11, 1997, in the form of modules that were interconnected with field-run piping, and electrical and instrumentation wiring. The equipment modules consisted of:

- Concentrator Unit Trailer Module (adsorber, desorber, fan, pneumatic transfer system, condenser, refrigeration unit, boiler unit, and all associated electrical equipment and controls - see Figure 2-2).

- Solvent Storage Tank Module (skid-mounted condensate storage tank and pump).

- The PDU Container Module (all of the PDU process equipment pre-piped, pre-wired and pre-instrumented. This module also contained the motor control center and the programmable logic control (PLC) system common to all of the modules. A small work office was also included in the PDU Module - see Figure 2-3).

- SVE Booster Blower Module (booster blower, water knockout, motor starter, and instrumentation/controls).

- Auxiliary Blower Module (auxiliary blower, pre-filter, motor starter, and instrumentation/controls).

The PTI System was installed adjacent to the southwest section of the security fencing surrounding the SVE&T system. Figure 1-1 identifies the location of the PTI System installation at the SVE&T facility. A crane was used for positioning of the equipment at the proper location. All of the PTI System modules were placed on cribbing as the primary support for the units. Grounding rods were placed at appropriate locations and grounding wires were provided to ensure the safe operation of the System. Installation of the equipment was completed in one day.

3.2 PTI System Start-Up

A mechanical check-out of the PTI system commenced on October 12th, after completion of installation activities. During this phase of the demonstration, the following start-up activities were completed:

- Field-run piping and electrical inter-ties to connect the existing SVE&T modules and SVE manifold piping to the PTI System modules.
- Performed system integrity checks (mechanical, piping, electrical, and instrumentation).
- Verified operation of SVE booster and auxiliary blowers.
- Loaded adsorbent beads into adsorber and desorber.
- Loaded reagent panels in PDU reactors.
- Performed mechanical start-up of the Concentrator Unit.
- Modified PDU inlet gas piping to accept dilution air.

PTI began processing SVE vapors from the Area 3 well piping beginning October 18th.

3.3 PTI System Operation

The PTI technology demonstration was performed in two phases. Phase 1 involved Parametric Testing to establish the optimal process configuration for Site 9 conditions. Once established, this configuration was implemented for Phase 2 of the demonstration, Steady-State Testing.

- **Parametric Tests (October 24, 1997 through January 8, 1998)**

Phase 1 consisted of Parametric Testing, which involved varying the feed gas flow from the SVE system and the condenser temperature. Three process configurations, discussed in detail below, were evaluated during the Parametric Testing. During this period the PTI System processed SVE off-gas for a total of 378 hours. Between tests, the system was shutdown to make the necessary process changes to perform the next series of tests. Because of this intermittent operation of the system, an on-line

availability rating was not calculated for the Parametric Tests. The results of the Parametric Tests are discussed below:

Configuration 1: Concentration-Condensation-Photolytic Destruction
Process Configuration-1 involved the use of all of the PTI System components. In this mode of operation, low boiling, non-condensable organics that do not condense in the condenser unit, are processed through the PDU.

Table 3-2 presents the operational parameters and performance results achieved during Configuration-1 tests. The VOC concentration data was collected and recorded using an on-line FID. The use of an on-line, continuous monitoring system allowed PTI to readily observe the effect of making system changes on performance. Note that Test 1-1, involving an SVE flow rate of 100 cfm, was not performed per the Work Plan, as it was not possible to operate the SVE Booster Blower at a flow-rate less than 150 cfm. The system was shutdown after completion of Test 1-6 to make the following modifications to the concentrator with the intention of improving system removal efficiencies:

- Replaced the flapper/check valve that controls the flow of adsorbent beads into the top of the desorber.. Because the original valve was not sealing well, it was believed that concentrated VOCs could be discharged to the top adsorber tray, and vented to the VPAC System.
- Installed taller weir plates in the adsorber to allow for a thicker layer of beads to form on each adsorption tray.
- Replaced the desorber downcomer tubes with smaller diameter tubes to increase the Adsorbent beads residence time in the desorber.
- Increased desorption temperature by 20 °F, to approximately 285 °F, to increase the removal of solvent from the adsorbent beads.
- Increased vacuum pressure in desorber from -0.3 mm to -0.5mm to increase the solvent desorption rate, and ensure that no solvent vapors could be allowed to vent back to the adsorber.
- Added additional adsorbent beads to the Concentrator Unit.

After making the above modifications, the system was restarted and tests 1-4 through 1-6 were repeated. The results of these tests are presented in Table 3-3.

It was evident, based on the higher DREs achieved during Configuration 1A Tests, that the System mechanical and operational changes were very effective. The lower "Average DRE %" achieved during Test 1-6A is related to the condenser temperature. At high condenser temperatures, less VOCs are condensed, thereby causing a greater recycle load of VOCs to return to the adsorber. A high recycle load of VOCs can "overload" the adsorber, thereby reducing process removal efficiencies.

Configuration 2 Test: Concentration-Condensation (No PDU)

Process Configuration-2 eliminates the use of the PDU to destroy the low boiling organic compounds. Rather, the VOCs are condensed into a liquid for off-site disposal. Any non-condensable vapors are recycled to the inlet of the adsorber. The results achieved during this series of tests, illustrated in Table 3-4, as evidenced by the lower "Average DRE %", show an increase in the recycle load of VOCs into the adsorber, leading to break-through of the chemicals into the adsorber outlet. PTI believes that higher "Average DRE %s" might have been achieved if tests were run at lower condenser temperatures. Operating the condenser at lower temperatures would have decreased the re-circulation load of low boiling point compounds to the adsorber.

Configuration 3 Test: Concentration- PDU (No Condensation)

Process Configuration-3 eliminates the use of the condenser and instead, all of the concentrated organic vapors are processed through the PDU. In this mode of operation, air rather than steam was used to sweep the concentrated vapors from the desorber. In order to operate the unit safely, the concentration of organic vapors was limited to levels that do not exceed 20% of the LEL.

Table 3-5 presents the operational parameters and performance results achieved during Configuration-3 tests. The lower than expected level of VOCs in the SVE off-gas enabled PTI to run Test 3-1 at a much higher SVE flow rate than originally designed. No further Configuration-3 tests were conducted because it was felt that no improvement over Configuration-1 test results would be achieved in this operational mode. Therefore, the System was shut-down to prepare for Steady-State Operation.

Upon review of the Parametric Test data, it was determined that the optimal operation parameters for long-term operation at Site 9 would be those which mimicked Test 1-4a. During this test, the System achieved the highest DRE (91.79%), using a higher condenser temperature (62° F), than other tests run at or near an average SVE flow rate of 265 scfm.

- **Steady-State Operation (January 17, 1998, through February 6, 1998)**

After completion of the Parametric Tests, the System was shutdown to prepare for Steady-State operation. During this shutdown the following work was performed:

- Installed software in the PLC to record the inlet and outlet FID measurements 24-hours per day.
- Installed a kilowatt meter to monitor system power consumption.

- Installed a water meter to monitor water consumption by the steam boiler (the PDU cooling water and condenser chiller water systems are self-contained and require little make-up water).
- Added adsorbent media to the Concentration Unit to replace any adsorbent beads lost to attrition during the Parametric Tests.
- Replaced the reagent panels with new panels. A sample was taken and sent to an independent laboratory for analysis.
- Repaired a number of small leaks observed in the condenser.
- Installed an eductor system to transport the adsorbent beads from the adsorber to the desorber. A positive pressure transport system, rather than the original negative pressure system, was used to prevent the plugging of adsorbent beads at the desorber inlet flapper valve.

Steady-State Operation began on January 17, 1998, and was completed on February 6, 1998. During this phase of testing, the System was operated 24-hours per day, 7-days per week, except during process shutdowns and holidays. The unit operated unattended during normal off-hours, weekends, and during weapons loading activities. The PTI System operated for a total of 440 hours during this period, and achieved an 89% on-line availability.

During the second week of Steady-State Operation, the decision was made to switch from using hot-air desorption to steam desorption. It was determined from the analytical test results that using steam desorption resulted in a higher removal efficiency. PTI chose to continue the use of steam as a desorption gas for the remainder of the demonstration. A summary of system performance during this period is provided in Tables 3-6 and 3-7.

3.4 Demobilization

After completion of the Phase 2 Steady-State Tests, the System was decontaminated and decommissioned. The decontamination work was performed in two steps. First, the Concentrator Unit was operated, using ambient air only, in a recycle mode to remove organics retained in the adsorbent beads. The organics were treated with the PDUs.

After the adsorbent was regenerated, the system was taken off-line and disassembled. Mechanical equipment that had been exposed to contamination was cleaned in conformance with the procedures defined in the Health and Safety Plan (Work Plan). Decontamination materials were also disposed in conformance with the Health and Safety Plan.

The reagent panels were composite sampled during removal from each of the PDUs. The sample was subjected to TCLP testing. The results of the tests, shown in Appendix F, proved the panels to be safe for landfill disposal. Originally, PTI had

planned to dispose of the panels in the Miramar Landfill, however this landfill's disposal application requirements were such that demobilization would have been delayed. As PTI had committed the use of the equipment for another project, it chose to have the panels shipped to its facility in Boise, Idaho, where the panels were disposed.

The liquid condensate collected during the demonstration was pumped into 55-gallon liquid storage containers and stored on the OHM Hazardous Waste Pad. Each of the containers were labeled as follows: "*Solvent Condensate, Analysis Pending, Generated on February 12th, 1998*". The condensate was sampled by PTI and analyzed for VOCs as per the Quality Assurance Project Plan (QAPP). The results of the analysis (Appendix G) showed the composition of the condensate to be similar to that collected by the OHM treatment system. The condensate was then combined with the OHM solvent for disposal.

The scrubber liquid was treated with liquid-phase granular activated carbon and analyzed as per the QAPP. The results of the testing, refer to Appendix H, showed the liquid to be safe for disposal in the OHM sump, for discharge to the base sanitary sewer system.

Similarly, the chiller water, cooling water and boiler blowdown were all discharged to the OHM sump, for discharge to the base sanitary sewer system.

3.5 Evaluation of Demonstration Objectives

This section discusses the test results with respect to each objective of the demonstration.

Objective 1. Determine the total average DRE achieved by the PTI System for all VOCs measured in the SVE off-gas, as well as individual DREs for critical VOCs.

The determination of the total VOC removal efficiency for the PTI System was to be calculated by inputting the process inlet and outlet VOC concentrations, as measured with EPA Method TO-12, into the following equation: $(\text{TO-12}_{inlet}-\text{TO-12}_{outlet})/\text{TO-12}_{inlet}$. However, a review of the analytical results show that the TO-12 analysis does not account for all VOCs in the SVE gas stream. This is manifested by comparing the VOC concentration as measured by the on-line FID, with that measured by EPA Method TO-12. The FID method has the advantage of pulling the gas sample through a heated line directly to the internal GC. The use of a heated line prevents the condensation, or "drop out", of any compounds with high boiling points. EPA Method TO-12, on the other hand, requires the capture of the sample gas in a summa canister. When the summa canister has been received by the analytical lab, it is pressurized to 10 psig to remove the volatile constituents.

Unfortunately, the heavier weight compounds remain in the canister. For this reason, PTI chose to use the on-line FID reading to measure total VOC removal efficiency. The results of the total VOC removal calculations, presented in Table 3-8, shows an average System DRE of 95.44%, during Steady-State Operations, and using steam as the desorption gas in the Concentration Unit.

Individual DREs for the critical VOCs were determined by TO-14 analysis. The critical VOCs were selected from a composite list of chemicals from recent sampling events at Site 9, Area 3 (Appendix 4, OHM, July 30, 1997). Critical VOCs are defined as those which were present in the composite data at levels ≥ 2 ppmv. Table 3-9 presents the individual DREs for each of the critical VOCs.

The destruction and removal efficiency of the PDUs was calculated separately by measuring the VOC concentrations at the inlet and outlet to the PDU System. The results of these calculations, presented in Table 3-10, show an average PDU DRE of 97.29%.

Objective 2. **Develop treatment cost data for a 3,000 standard cubic feet per minute (scfm) PTI system, designed to achieve the DREs measured above, for VOC-contaminated soil vapor similar to those at Site 9. PTI will operate their system in several configurations and parameters to fully demonstrate the performance of the system under differing conditions while obtaining the supporting cost data. Cost data will be reduced to a $/lb. of VOC treated at various removal efficiencies. These costs will be compared to the costs to achieve an overall removal efficiency of 99% of VOCs at NAS North Island Site 9 using regenerative carbon adsorption and thermal oxidation.**

The cost estimate shown in Table 3-11 was developed using data collected from the demonstration. Standard engineering principles were used to scale-up costs for a 3,000 scfm system. This is the size system presently required to treat 100% of the soil vapor gas being extracted at Site 9. The $/LB. of VOC treated is estimated to be $3.77. The assumptions made to derive the 3,000 scfm treatment system cost are in Table 3-11.

Objective 3. **Characterize and quantify secondary waste streams generated by the PTI system at Site 9 and determine the appropriate disposal option(s) for each. Estimate the costs of disposal of all secondary waste streams generated.**

The secondary waste streams produced from the PTI system included: spent reagent panels from the PDUs, scrubber blowdown, and liquid condensate from the

condenser. Each of these waste sources was monitored throughout the demonstration. A brief discussion of the evaluation methods used for secondary waste streams from each sub-system is given below:

Reagent Panels

The reagent panels are used to capture and transform acidic radicals, formed by photo-dissociation of halogenated compounds, into stable, inert organic salts. One set each of fresh panels were installed in the PDU reactors for Phase 1 and Phase 2 tests. At the completion of the demonstration, samples taken from the spent reagent panels were analyzed according to the TCLP test method. The results of these analyses, presented in Appendix F, demonstrate that the panels were non-hazardous waste. The total weight of reagent used in the demonstration was approximately 960 lbs, over a period of 1,229 hours. The approximate cost of the panels consumed during the demonstration was $700.00. Due to strict time limitations, PTI chose to landfill the waste in Boise, Idaho, rather than in the Miramar landfill.

Scrubber Blowdown

The PTI system includes a small (25 scfm) acid gas scrubber which operates in a batch mode. The aqueous scrubber discharge was tested to determine whether the waste meets the NAS North Island sanitary sewer acceptance criteria. The scrubber blowdown was analyzed for VOCs by EPA Method 8260A. Total dissolved solids (TDS) and total suspended solids (TSS) were determined by methods 160.1 and 160.2, respectively; and pH was determined with the pH probe in the scrubber unit. The results of these analyses, presented in Appendix H, show that the liquid met the discharge requirements. The total volume of liquid discharged at the completion of the demonstration was 18.5 gallons. The approximate cost of the caustic chemicals used in the scrubber during the demonstration was $62.00.

Liquid Condensate

The PTI system utilizes a water-cooled condenser to preferentially remove non-chlorinated hydrocarbons from the concentrated gas stream, prior to treatment in the PDUs. This condensate was sampled and analyzed for disposal purposes using EPA Method 8260A. These analyses are attached as Appendix G. As the sample analysis confirmed, the composition of the condensate was found to be typical of the current SVE&T operation. Therefore, the condensate was pumped to the SVE&T wet-end skid. Approximately 255 gallons of condensate were collected during the demonstration. The estimated cost to dispose of the liquid condensate, at $0.17/lb., was $347.00.

Objective 4. Characterize and quantify all residuals, including hydrochloric acid (HCl), ozone, chlorine, phosgene, carbon monoxide and dioxins, exiting the PTI system.

The concentrations of HCl, chlorine, phosgene and carbon monoxide were measured at the PDU outlet and the PTI system outlet. Ozone analysis was not performed due to an oversight by PTI. Dioxin analysis was not performed as no PCB-indicating compounds were measured in the SVE off-gas.

HCl and Chlorine

Sampling and analysis for HCl and chlorine was performed using EPA Method 26A. Gas samples were taken at the outlet of the PDU scrubber and at the outlet of the adsorber, the total system outlet. HCl was measured at a concentration of 22.1 ppbv (PDU scrubber outlet) and 0.18 ppbv (System outlet), while chlorine was measured at a concentration of 7.4 ppbv and 0.04 ppbv, respectively.

Phosgene

Phosgene was determined by EPA Method TO-6. Gas samples were taken at the outlet of the PDU scrubber and at the outlet of the adsorber. At these sample locations, phosgene was measured at concentrations of 1,472.7 ppbv and 23.8 ppbv, respectively.

CO

Carbon monoxide was determined by ASTM D-1946. CO was measured in the SVE off-gas and at the PTI System outlet, to determine the amount of CO produced in the System. The concentration of CO was below the detection limit of 0.0025% (v/v) in the SVE off-gas, and an average of 0.0056% (v/v) at the system outlet. Therefore, the amount of CO produced in the PTI System was between 0.0031 and 0.0056%.

Dioxins

Dioxin testing was to be performed, using EPA Method 23.0, only if PCB-indicating compounds were found to be in the SVE off-gas stream. Past demonstrations of the PTI system have shown no dioxin formation when PCBs are not present. Because the potential for PCBs exists in the contaminated soil at Site 9, Area 3, PCBs, pesticides and SVOCs were sampled for during week 1 using California Air Resources Board (CARB) Method 429. This analysis showed no presence of PCB-indicating compounds present in the SVE off-gas, therefore no dioxin tests were performed.

Detailed analyses of the results discussed above are presented in Appendix E. A tabular comparison of the System residuals to allowable levels within the San Diego Air pollution Control District is presented in Table 3-12. This comparison shows that the residual levels were in fact below known maximum allowable levels for CO and HCl. In a conversation with a San Diego Air Pollution Control District manager, PTI learned that emission standards for chlorine and phosgene are not established but reviewed and determined on a case-by-case basis. For the purposes of this report a formal emissions review application was not submitted.

Objective 5. Document observed operating problems and their solutions.

This demonstration of an integrated Concentrator Unit and PDU was the first of its kind for the treatment and destruction of gas-phase VOCs. In fact, this project was the first field implementation of a concentrator system by PTI. This demonstration provided an invaluable learning experience for PTI, and will hopefully provide valuable cost and performance data for the U.S. Navy and other DoD agencies.

Process operating parameters were monitored by PTI personnel throughout the test period on a regular basis. A discussion of problems encountered with each of the PTI System modules follows. PTI is confident that all of the operational problems encountered were resolved satisfactorily, and further plans to incorporate design modifications into the system to prevent these problems on future installations. A discussion of these problems and their solutions for each component of the system is given below.

<u>Concentrator Unit</u>

- The most significant operational problems were encountered during the Parametric Tests as a direct result of very heavy rains. All of these problems were due to rain water or condensate getting sucked into the adsorber or desorber (both units operate under vacuum), and subsequently plugging the flow of adsorbent beads. This plugged flow would result in a system shutdown due to a high pressure alarm. Several measures were taken to prevent this plugging from occurring: insulating the desorber and adsorbent transfer lines to prevent condensate from forming in these areas; extending the PDU return line into the adsorber approximately 12 inches (") to prevent condensate from collecting in the adsorber downcomer sections; sealing all seams in the adsorber and adsorbent transfer containers with silicon; piping the adsorber pressure vents to a manifold header to prevent the transfer of rain water into the adsorber; and placing c-clamps to tighten the seals between adsorber stages.
- A fine mesh screen, installed at the outlet of the adsorber to prevent adsorbent beads from exiting the system, became plugged with a very fine black powder. PTI believes this powder was created from the conditioning of the adsorbent beads. If not monitored, PTI found that this plugging would eventually shutdown the system on a high pressure alarm. To solve this problem, the screen was replaced with a perforated plate having 60% free area and 0.05" diameter holes.
- A high-temperature excursion (650 °F) was noted in the desorber, forcing the shutdown of the system. PTI determined that the temperature excursion was caused by the plugging of adsorbent beads at the bottom of the desorber. Once plugged, the beads were subjected to high temperatures (285 °F) for a prolonged period of time, in excess of 12 hours. PTI believes these high temperature conditions, coupled with high concentrations of solvent, led to an exothermic

reaction. The system was allowed to cool and later inspected. No visible signs of damage were present, and samples of the adsorbent beads were taken for analysis. This problem was not experienced again.

- A couple of leaks were noted at a weld point in the condenser. These were repaired on-line with J-B Weld©.
- Higher than expected attrition of the adsorbent beads was experienced throughout the demonstration. PTI is not sure if this is a characteristic of the adsorbent material itself or, a result of high shear forces breaking the adsorbent beads down. PTI will be making equipment modifications to reduce gas flow velocities in the adsorber and the transfer tubes to reduce high shear forces.
- Initially, PTI was unable to operate the desorber using strip steam unattended due to a PLC programming error. This was corrected by making a minor modification in the control program.

PDU

- During continuous operation, the outlet manifold of each PDU reactor would become choked with a very dry, friable, material believed to be caused by the condensation of heavy-chained hydrocarbons leaving the relatively hot reactor internal area and entering the cooler transfer line to the scrubber. A similar material was noted during operations at McClellan Air Force Base (AFB). During the McClellan AFB demonstration this material was tested using EPA Method 8015-M and shown to contain "unidentified extractable hydrocarbons in the C9 to C22 range" (CH_2M Hill). To overcome this problem, PTI would routinely "rod-out" this material, thereby clearing the outlet manifold and capturing the material in the scrubber. PTI plans to incorporate an automatic purge system to keep the outlet manifold clear in future designs.
- PTI discovered that a transformer ballast used to power the UV lamps in the PDU reactors had been damaged during shipping. The damaged ballast was replaced.

Objective 6. Disseminate the results of the demonstration throughout the DoD, DOE, private industry, state regulatory agencies and the NAS RAB.

The results of this technology demonstration will be presented to other Naval Remedial Project Managers, compiled into a database for distribution to interested public and private sector parties, and shown on the NFESC web page. The RAB is a partnership between NAS North Island, local regulatory agencies and the local community. The purpose of the RAB is to review and comment on remedial action methods prior to implementation. Therefore, any innovative technology that is considered for implementation at NAS North Island will be reviewed by the RAB. This Final Report will be submitted to the RAB for their information and review.

4.0 Conclusions and Recommendations

The following conclusions were developed by PTI from the technology demonstration:

- The PTI System is relatively quick to install and ready for operation as demonstrated by the experience at Site 9, where it was installed and commissioned within one week. The equipment operated continuously, 24-hours per day, seven days per week, achieving an on-line availability of 89%.

- For treatment of the SVE off-gas at Site 9, Configuration-1: "Concentration-Condensation-Photolytic Destruction" was the most efficient setup.

- The PTI system was successful in removing VOCs in the SVE off-gas to below the maximum allowable emissions at Site 9 of 25 ppmv. The average total DRE for VOCs was 95%. The PDU alone achieved an overall DRE of 97%. These results were computed from FID data.

- The estimated unit cost of implementing a 3,000 scfm PTI System at Site 9 is $3.77 per lb. of VOC treated. The commercialization of the technology over the next few years will lower the treatment costs further.

Based upon this demonstration, PTI recommends implementing the following design modifications to enhance system performance and/or reduce treatment costs:

- Redesign the weather seals in the Concentration Unit to prevent ambient rainwater and humidity from entering the adsorber.

- Evaluate the performance of different adsorbent materials to determine which adsorbent would offer the highest removal efficiencies, cost effectively.

5.0 References

"*Process Technologies Incorporated, Technology Demonstration Final Work Plan*", NAS North Island, Site 9, Contract No. N47408-97-C0125, October 1997.

"*Photolytic Destruction Technology Memorandum*", McClellan Air Force Base, Site S, Operable Unit D, CH_2M Hill, June 1996.

"*Final Project Plan for Non-Time Critical Removal Action for Sites 9 and 11, Naval Air Station North Island, San Diego County, CA*", OHM Remediation Services Corporation, April 1996.

Table 3-2
Configuration 1 Parametric Test Results

Process Parameters	Test 1-2	Test 1-3	Test 1-4	Test 1-5	Test 1-6
SVE Flow (scfm)	151	209	245	290	259
Make-up Air (scfm)	306	290	223	160	111
Condenser Temperature (°F)	69	67	59	52	60
Inlet Concentration (ppmc)[1]	279	309	366	1,367	1,453
Outlet Concentration (ppmc)	188	86	127	513	463
Average DRE (%)	32.62	72.17	65.30	62.47	68.13

Table 3-3
Configuration 1A Parametric Test Results

Process Parameters	Test 1-4a	Test 1-5a	Test 1-6a
SVE Flow (scfm)	265	267	266
Make-up Air (scfm)	149	130	133
Condenser Temperature (°F)	62	52	69
Inlet Concentration (ppmc)[1]	928	1,009	1,022
Outlet Concentration (ppmc)	55	112	265
Average DRE (%)	94.07	88.90	74.07

Note:
1. VOC concentration as measured by an on-line FID. A compete set of data, recorded on a 24-hour basis during Steady-State operations, is included in Appendix C.

Table 3-4
Configuration 2 Parametric Test Results

Process Parameters	Test 2-2	Test 2-3	Test 2-4	Test 2-5	Test 2-6
SVE Flow (scfm)	148	211	258	262	215
Make-up Air (scfm)	169	210	68	141	124
Condenser Temperature (°F)	80	66	78	50	67
Inlet Concentration (ppmc)[1]	966	337	1,427	1,860	1,110
Outlet Concentration (ppmc)	582	115	414	551	433
Average DRE (%)	39.75	65.88	70.99	70.38	60.99

Table 3-5
Configuration 3 Parametric Test Results

Process Parameters	Test 3-1
SVE Flow (scfm)	215
Make-up Air (scfm)	200
Condenser Temperature (°F)	NA
Inlet Concentration (ppmc)[1]	1,443
Outlet Concentration (ppmc)	480
Average DRE (%)	66.74

Note:

1. VOC concentration as measured by an on-line FID. A compete set of data, recorded on a 24-hour basis during Steady-State operations, is included in Appendix C.

Table 3-6
Steady-State Test Results - Hot Air Desorption

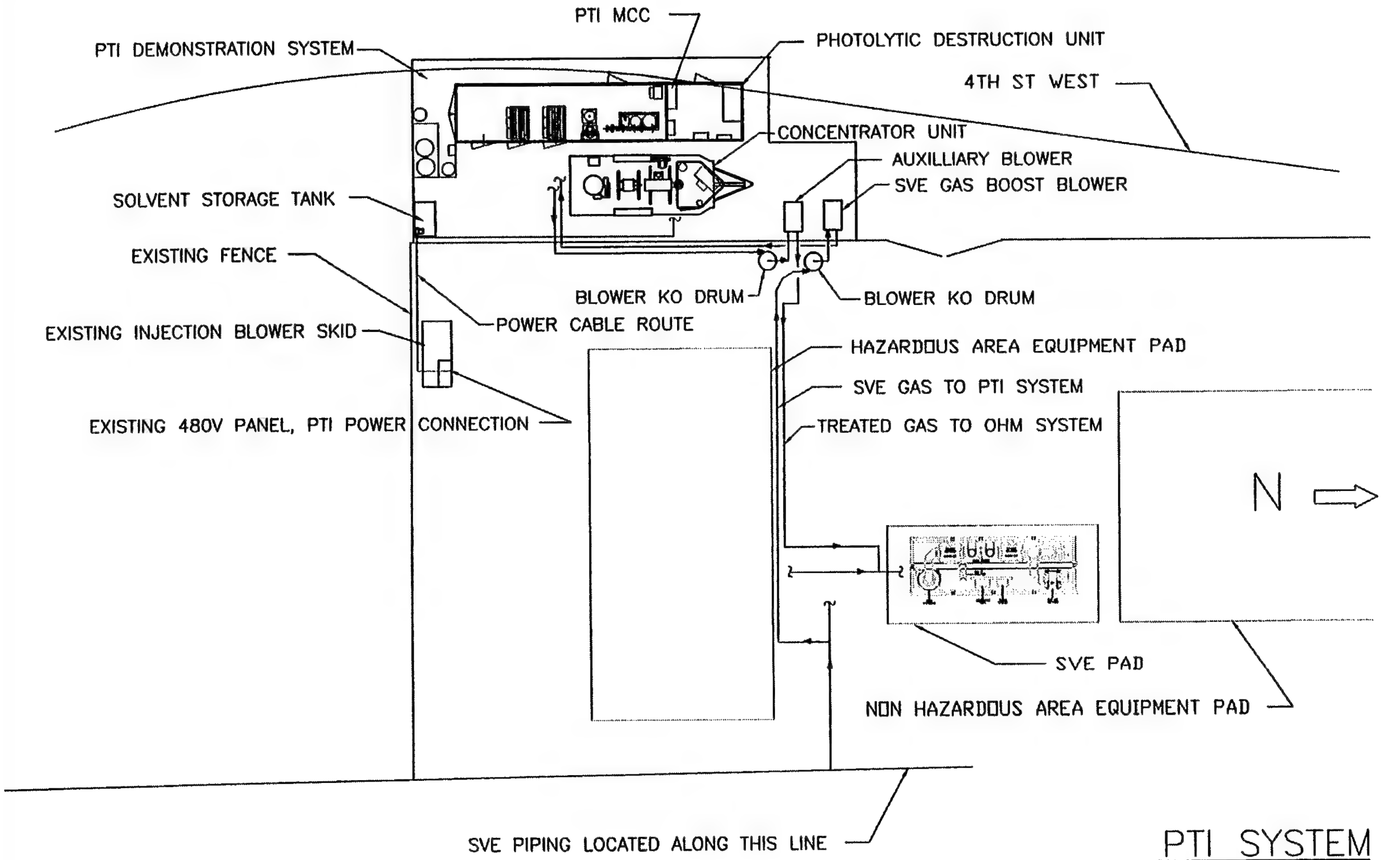
Process Parameters	Low	High	Average
SVE Flow (scfm)	239	267	245
Make-up Air (scfm)	57	157	100
Condenser Temperature (°F)	80	90	83
Inlet Concentration (ppmc)[1]	890	1,175	995
Outlet Concentration (ppmc)	83	170	125
DRE	80.90	92.94	87.37

Table 3-7
Steady-State Test Results - Steam Desorption

Process Parameters	Low	High	Average
SVE Flow (scfm)	243	307	267
Make-up Air (scfm)	51	102	76
Condenser Temperature (°F)	88	110	96
Inlet Concentration (ppmc)[1]	1,010	1,141	1,056
Outlet Concentration (ppmc)	14	93	44
DRE	91.85	96.76	95.93

Note:

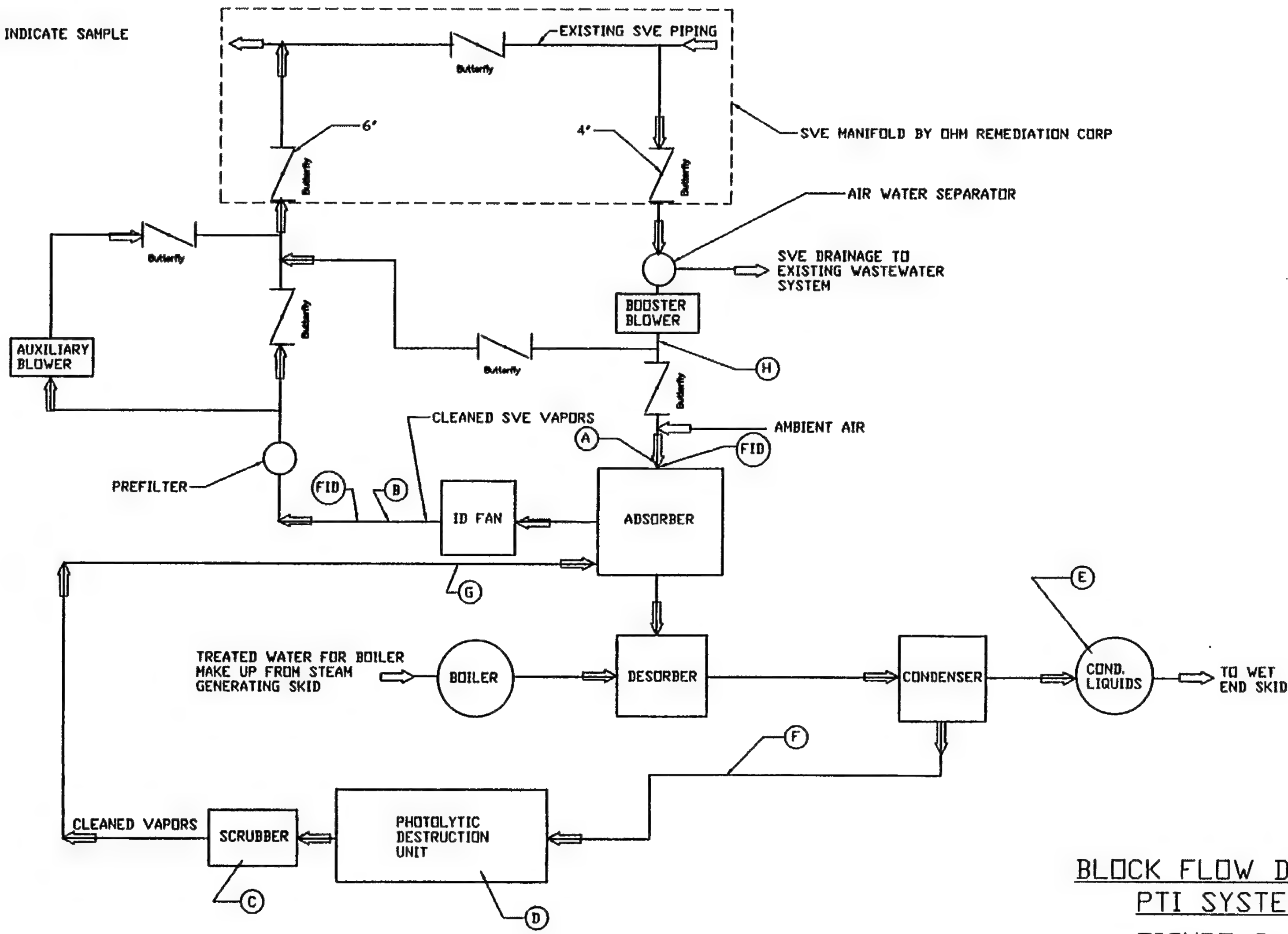
1. VOC concentration as measured by an on-line FID. A compete set of data, recorded on a 24-hour basis during Steady-State operations, is included in Appendix C.



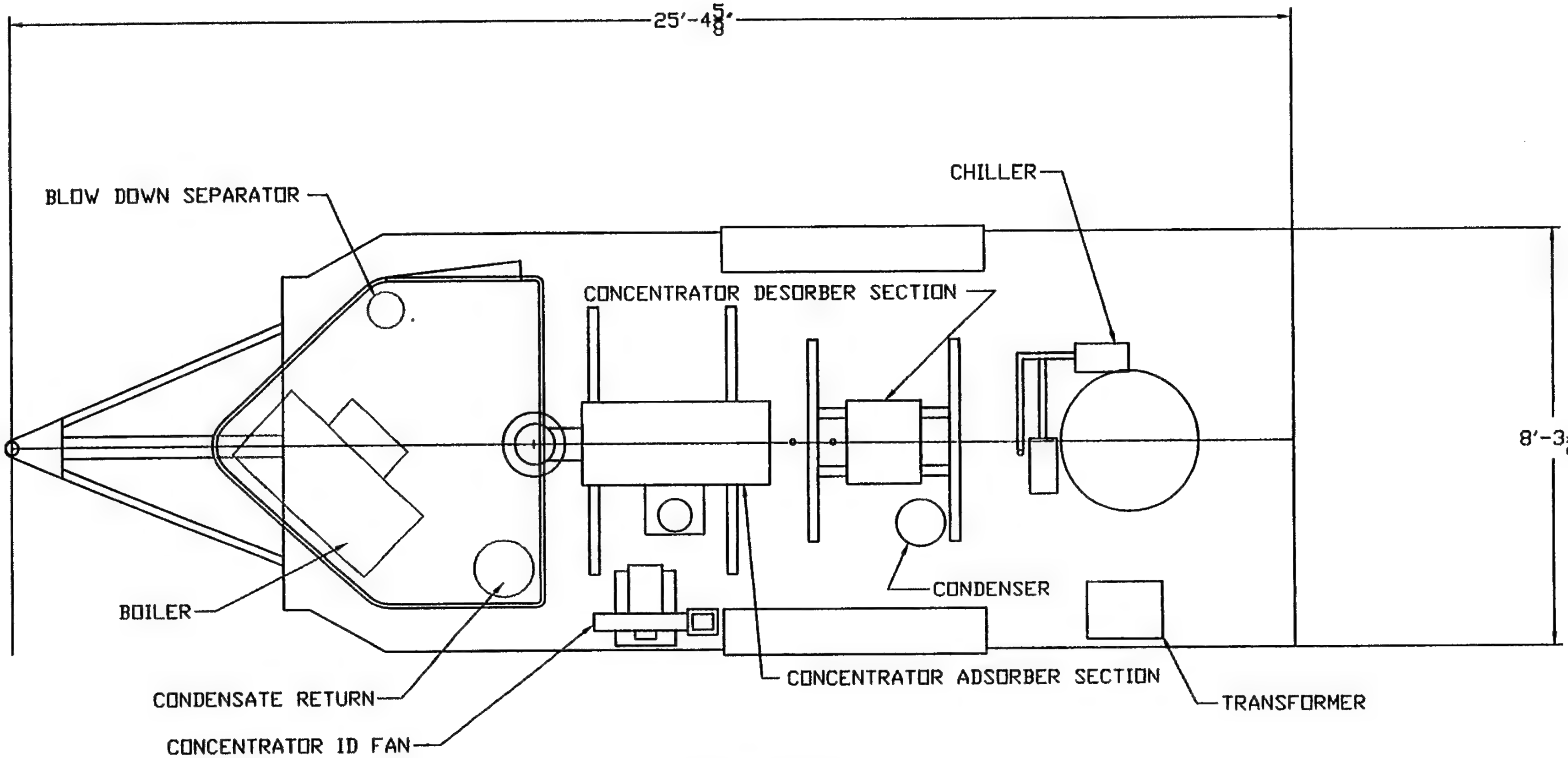
PTI SYSTEM LOCATING PLAN
FIGURE 1-1

NOTES:

1. (A) THROUGH (H) INDICATE SAMPLE LOCATIONS.

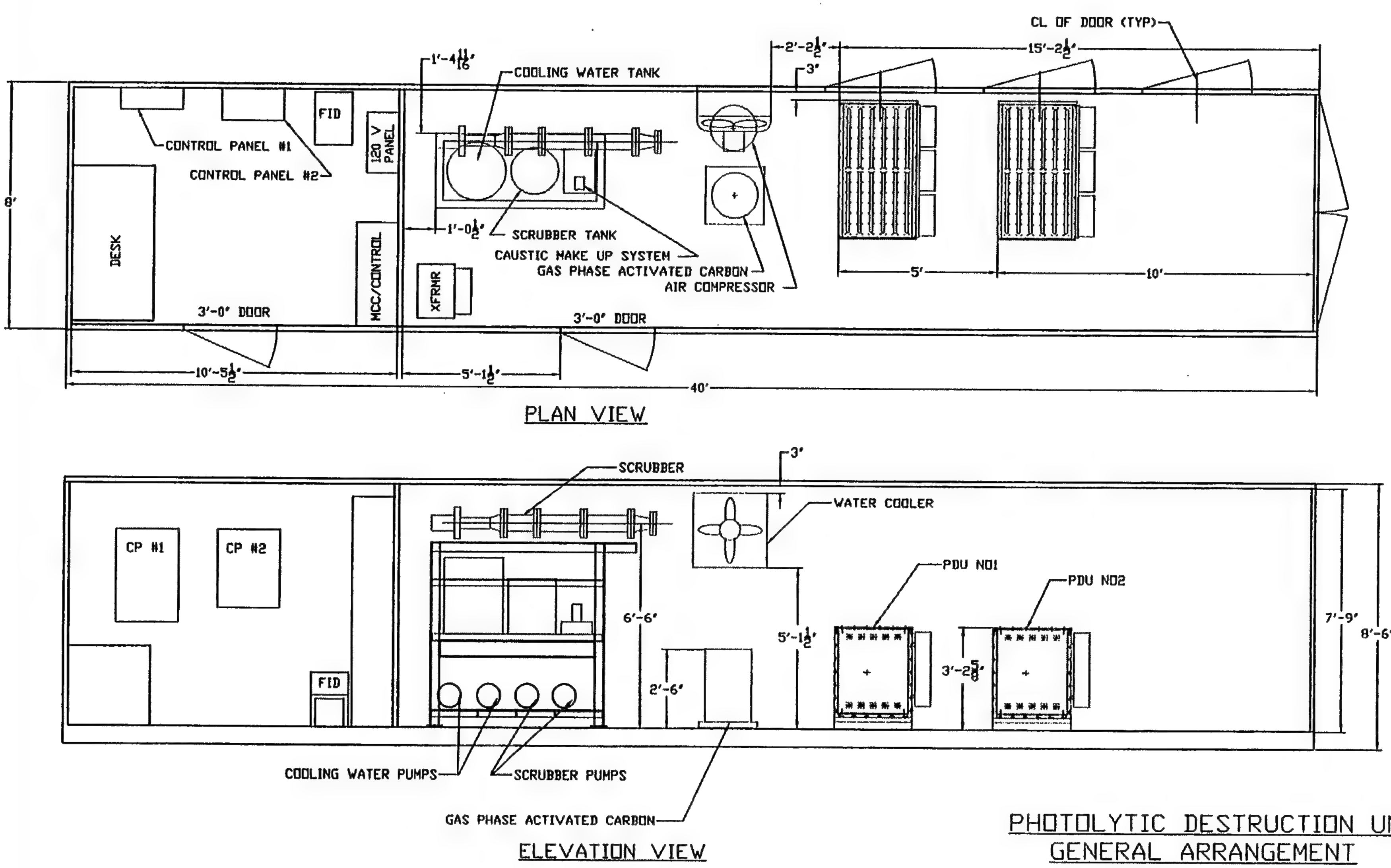


BLOCK FLOW DIAGRAM
PTI SYSTEM
FIGURE 2-1



PLAN VIEW

CONCENTRATOR UNIT
GENERAL ARRANGEMENT
FIGURE 2-2



PHOTOLYTIC DESTRUCTION UNIT
GENERAL ARRANGEMENT
FIGURE 2-3

APPENDIX A
Operations Data Presented by Day

Contents:

System Conditioning Field Data
Parametric Tests Field Data
Steady-State Tests Field Data

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

DATA	10/21-23/97 System Conditioning
SVE INLET FLOW (SCFM)	250
SVE INLET TEMP (F)	
DILUTION AIR FLOW (SCFM)	100
DILUTION AIR TEMP (F)	
DILUTION AIR PRESS (INCH WC)	
COMBINED INLET AIR FLOW (SCFM)	350
COMBINED INLET AIR TEMP (F)	
COMBINED INLET AIR PRESS (INCH WC)	
OUTLET GAS FLOW (SCFM)	350
OUTLET GAS TEMP (F)	
OUTLET GAS PRESS (INCH WC)	
ADSORBER PRESS TOP (kPa)	
ADSORBER PRESS MID (kPa)	
ADSORBER PRESS BOTTTOM (kPa)	
DESORBER PRESS MID (kPa)	
DESORBER PRESS BOT (kPa)	
CONDENSER TEMP (F)	
CHILLED WATER TEMP (F)	
DILUTION AIR TO PDUs (SCFM)	
TOTAL FLOW TO PDUs	
FEED GAS TEMP TO PDUs (F)	
FEED GAS PRESS TO PDUs (INCH WC)	
PDU COOLING WATER INLET TEMP (F)	
PDU #1 COOLING WATER OUTLET TEMP (F)	
PDU #2 COOLING WATER OUTLET TEMP (F)	
PDU #1 COOLING WATER FLOW (GPM)	
PDU #2 COOLING WATER FLOW (GPM)	
PDU #1 PRESS DROP MID TO OUT (INCH WC)	
PDU #2 PRESS DROP MID TO OUT (INCH WC)	
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)	
SCRUBBER OUTLET PRESS (INCH WC)	
COOLING WATER TANK TEMP (F)	
SCRUBBER LIQUID FLOW (GPM)	
SCRUBBER pH	
OHM SVE RETURN HEADER PRESS (INCH WC)	
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)	
BOOSTER BLOWER SUCTION PRESS (INCH WC)	
PDU #1 TEMP (F)	
PDU #2 TEMP (F)	
DESORBER TEMP MID (F)	
DESORBER TEMP BOTTOM (F)	
BOILER PRESS (PSIG)	
SOLVENT STORAGE TANK LEVEL (INCH)	
INLET GAS FID READING (PPM)	1274
OUTLET GAS FID READING (PPM)	206
LEL METER (%)	
WATT METER (kW)	
HOUR METER	47
AMBIENT CONDITIONS (TEMP/HUMIDITY)	
OPERATOR COMMENTS:	M.Gray

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

	Date:10/24/97	Test 1-2	M.Gray
DATA	TEST START	TEST MIDPOINT	TEST END
SVE INLET FLOW (SCFM)	152	151	144
SVE INLET TEMP (F)	123	152	150
DILUTION AIR FLOW (SCFM)	329	301	289
DILUTION AIR TEMP (F)	88	88	88
DILUTION AIR PRESS (INCH WC)	-2.0	-1.5	-2.0
COMBINED INLET AIR FLOW (SCFM)	452	453	439
COMBINED INLET AIR TEMP (F)	100	107	108
COMBINED INLET AIR PRESS (INCH WC)	-4.0	-4.0	-4.0
OUTLET GAS FLOW (SCFM)	481	452	433
OUTLET GAS TEMP (F)	102	106	105
OUTLET GAS PRESS (INCH WC)	-5.5	-6.5	-2
ADSORBER PRESS TOP (kPa)	-4.4	-4	-3.8
ADSORBER PRESS MID (kPa)	-2.6	-2.3	-2.4
ADSORBER PRESS BOTTTOM (kPa)	-1.0	-0.8	-0.8
DESORBER PRESS MID (kPa)	0.14	0.34	0.32
DESORBER PRESS BOT (kPa)	0.3	0.28	0.4
CONDENSER TEMP (F)	62	74	70
CHILLED WATER TEMP (F)	37	39	36.4
DILUTION AIR TO PDUs (SCFM)	5.25	5.25	5.0
TOTAL FLOW TO PDUs			
FEED GAS TEMP TO PDUs (F)	85.2	87	80
FEED GAS PRESS TO PDUs (INCH WC)			
PDU COOLING WATER INLET TEMP (F)			
PDU #1 COOLING WATER OUTLET TEMP (F)			
PDU #2 COOLING WATER OUTLET TEMP (F)			
PDU #1 COOLING WATER FLOW (GPM)			
PDU #2 COOLING WATER FLOW (GPM)			
PDU #1 PRESS DROP MID TO OUT (INCH WC)			
PDU #2 PRESS DROP MID TO OUT (INCH WC)			
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)			
SCRUBBER OUTLET PRESS (INCH WC)			
COOLING WATER TANK TEMP (F)	112.5	111.1	111.2
SCRUBBER LIQUID FLOW (GPM)			
SCRUBBER pH			
OHM SVE RETURN HEADER PRESS (INCH WC)			
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)			
BOOSTER BLOWER SUCTION PRESS (INCH WC)	-18	-18	-17
PDU #1 TEMP (F)	179	190.6	192
PDU #2 TEMP (F)	152.8	161.8	151
DESORBER TEMP MID (F)	253.5	242.8	259.1
DESORBER TEMP BOTTOM (F)	252.7	265.7	266
BOILER PRESS (PSIG)	70	70	70
SOLVENT STORAGE TANK LEVEL (INCH)			
INLET GAS FID READING (PPM)	427	202	207
OUTLET GAS FID READING (PPM)	348	115	100
LEL METER (%)			
WATT METER (kW)			
HOUR METER			70
AMBIENT CONDITIONS (TEMP/HUMIDITY)			
OPERATOR COMMENTS:	Operating on wells 3 and 5.		

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

	Date:10/25/97	Test 1-3	M.Gray
DATA	TEST START	TEST MIDPOINT	TEST END
SVE INLET FLOW (SCFM)	206	213	209
SVE INLET TEMP (F)	123	121	120
DILUTION AIR FLOW (SCFM)	300	267	303
DILUTION AIR TEMP (F)	85	90	86
DILUTION AIR PRESS (INCH WC)	-1.0	-1.0	-0.5
COMBINED INLET AIR FLOW (SCFM)	506	480	512
COMBINED INLET AIR TEMP (F)	105	102	100
COMBINED INLET AIR PRESS (INCH WC)	-2.5	-3.0	-2.0
OUTLET GAS FLOW (SCFM)	506	480	512
OUTLET GAS TEMP (F)	104	100	102
OUTLET GAS PRESS (INCH WC)	-4.0	-4.5	-1.0
ADSORBER PRESS TOP (kPa)	-4.0	-4.0	-0.38
ADSORBER PRESS MID (kPa)	-2.3	-2.8	-2.4
ADSORBER PRESS BOTTTOM (kPa)	-0.8	-0.8	-0.8
DESORBER PRESS MID (kPa)	-0.22	-0.2	-0.2
DESORBER PRESS BOT (kPa)	-0.32	-0.26	-0.24
CONDENSER TEMP (F)	66	70	64
CHILLED WATER TEMP (F)	35.8	35.3	35.9
DILUTION AIR TO PDUs (SCFM)	5.0	4.0	3.5
TOTAL FLOW TO PDUs			
FEED GAS TEMP TO PDUs (F)	85.6	84.6	75.3
FEED GAS PRESS TO PDUs (INCH WC)			
PDU COOLING WATER INLET TEMP (F)			
PDU #1 COOLING WATER OUTLET TEMP (F)			
PDU #2 COOLING WATER OUTLET TEMP (F)			
PDU #1 COOLING WATER FLOW (GPM)			
PDU #2 COOLING WATER FLOW (GPM)			
PDU #1 PRESS DROP MID TO OUT (INCH WC)			
PDU #2 PRESS DROP MID TO OUT (INCH WC)			
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)			
SCRUBBER OUTLET PRESS (INCH WC)			
COOLING WATER TANK TEMP (F)	110.6	119.8	84.7
SCRUBBER LIQUID FLOW (GPM)			
SCRUBBER pH			
OHM SVE RETURN HEADER PRESS (INCH WC)			
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)			
BOOSTER BLOWER SUCTION PRESS (INCH WC)	-34	-34	-34
PDU #1 TEMP (F)	158.4	166.2	172.4
PDU #2 TEMP (F)	145.3	153.4	148.7
DESORBER TEMP MID (F)	267.3	279.2	274.7
DESORBER TEMP BOTTOM (F)	250.1	250.9	249.3
BOILER PRESS (PSIG)	70	70	70
SOLVENT STORAGE TANK LEVEL (INCH)			
INLET GAS FID READING (PPM)	305	296	325
OUTLET GAS FID READING (PPM)	93	79	86
LEL METER (%)			
WATT METER (kW)			
HOUR METER			
AMBIENT CONDITIONS (TEMP/HUMIDITY)			90
OPERATOR COMMENTS:			

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

	Date:10/26/97	Test 1-4	M.Gray
DATA	TEST START	TEST MIDPOINT	TEST END
SVE INLET FLOW (SCFM)	244	242	249
SVE INLET TEMP (F)	121	119	117
DILUTION AIR FLOW (SCFM)	236	223	209
DILUTION AIR TEMP (F)	92	92	92
DILUTION AIR PRESS (INCH WC)	-0.5	-0.5	-0.5
COMBINED INLET AIR FLOW (SCFM)	480	465	458
COMBINED INLET AIR TEMP (F)	108	105	104
COMBINED INLET AIR PRESS (INCH WC)	-2.0	-2.0	-2.0
OUTLET GAS FLOW (SCFM)	480	445	438
OUTLET GAS TEMP (F)	102	103	104
OUTLET GAS PRESS (INCH WC)	-2.5	-2.5	-2.5
ADSORBER PRESS TOP (kPa)	-3.8	-3.9	-3.6
ADSORBER PRESS MID (kPa)	-2.2	-2.2	-2.1
ADSORBER PRESS BOTTTOM (kPa)	-0.6	-0.65	-0.6
DESORBER PRESS MID (kPa)	-0.14	-0.18	-0.2
DESORBER PRESS BOT (kPa)	-0.2	-0.28	-0.28
CONDENSER TEMP (F)	72	53	52
CHILLED WATER TEMP (F)	37	38.1	35.7
DILUTION AIR TO PDUs (SCFM)	6	6	5
TOTAL FLOW TO PDUs			
FEED GAS TEMP TO PDUs (F)	87	85.6	81.7
FEED GAS PRESS TO PDUs (INCH WC)		-12.5	
PDU COOLING WATER INLET TEMP (F)			
PDU #1 COOLING WATER OUTLET TEMP (F)			
PDU #2 COOLING WATER OUTLET TEMP (F)			
PDU #1 COOLING WATER FLOW (GPM)			
PDU #2 COOLING WATER FLOW (GPM)			
PDU #1 PRESS DROP MID TO OUT (INCH WC)			
PDU #2 PRESS DROP MID TO OUT (INCH WC)			
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)			
SCRUBBER OUTLET PRESS (INCH WC)			
COOLING WATER TANK TEMP (F)	118.2	118	116.3
SCRUBBER LIQUID FLOW (GPM)		12.16	
SCRUBBER pH		10.19	
OHM SVE RETURN HEADER PRESS (INCH WC)			
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)			
BOOSTER BLOWER SUCTION PRESS (INCH WC)	-33	-33	-33
PDU #1 TEMP (F)	168.2	173.6	177.6
PDU #2 TEMP (F)	147.8	159.1	160
DESORBER TEMP MID (F)	281.6	282	278.1
DESORBER TEMP BOTTOM (F)	254.2	253.3	249.7
BOILER PRESS (PSIG)	70	65	0
SOLVENT STORAGE TANK LEVEL (INCH)			
INLET GAS FID READING (PPM)	362	364	371
OUTLET GAS FID READING (PPM)	132	127	123
LEL METER (%)		2	
WATT METER (kW)			
HOUR METER			113
AMBIENT CONDITIONS (TEMP/HUMIDITY)			
OPERATOR COMMENTS:			

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

	Date:10/27/98	Test 1-5	R.Cooper
DATA	TEST START	TEST MIDPOINT	TEST END
SVE INLET FLOW (SCFM)	294	288	288
SVE INLET TEMP (F)	110	115	112
DILUTION AIR FLOW (SCFM)	170	164	147
DILUTION AIR TEMP (F)			
DILUTION AIR PRESS (INCH WC)			
COMBINED INLET AIR FLOW (SCFM)	464	452	435
COMBINED INLET AIR TEMP (F)			
COMBINED INLET AIR PRESS (INCH WC)	-0.5	1.0	-0.5
OUTLET GAS FLOW (SCFM)	464	452	435
OUTLET GAS TEMP (F)	105	107	102
OUTLET GAS PRESS (INCH WC)	-3	-4	-3
ADSORBER PRESS TOP (kPa)	-3.4	-2.6	-3.4
ADSORBER PRESS MID (kPa)	-1.8	-1.4	-1.6
ADSORBER PRESS BOTTTOM (kPa)	-0.5	-0.2	-0.5
DESORBER PRESS MID (kPa)	-0.2	-0.22	-0.2
DESORBER PRESS BOT (kPa)	-0.28	-0.26	-0.26
CONDENSER TEMP (F)	52	52	52
CHILLED WATER TEMP (F)	39.7	39.2	35.9
DILUTION AIR TO PDUs (SCFM)	5.5	4.0	5.25
TOTAL FLOW TO PDUs			
FEED GAS TEMP TO PDUs (F)	83	83	76.6
FEED GAS PRESS TO PDUs (INCH WC)			
PDU COOLING WATER INLET TEMP (F)			
PDU #1 COOLING WATER OUTLET TEMP (F)			
PDU #2 COOLING WATER OUTLET TEMP (F)			
PDU #1 COOLING WATER FLOW (GPM)			
PDU #2 COOLING WATER FLOW (GPM)			
PDU #1 PRESS DROP MID TO OUT (INCH WC)			
PDU #2 PRESS DROP MID TO OUT (INCH WC)			
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)			
SCRUBBER OUTLET PRESS (INCH WC)			
COOLING WATER TANK TEMP (F)	114.3	114.7	117.1
SCRUBBER LIQUID FLOW (GPM)			
SCRUBBER pH			
OHM SVE RETURN HEADER PRESS (INCH WC)			
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)			
BOOSTER BLOWER SUCTION PRESS (INCH WC)	-16	-16	-16
PDU #1 TEMP (F)	175	184.7	171.3
PDU #2 TEMP (F)	156.1	164	155.1
DESORBER TEMP MID (F)	265.3	266	272
DESORBER TEMP BOTTOM (F)	240.1	240.2	234
BOILER PRESS (PSIG)	70	70	70
SOLVENT STORAGE TANK LEVEL (INCH)			3
INLET GAS FID READING (PPM)	1380	1530	1280
OUTLET GAS FID READING (PPM)	510	540	490
LEL METER (%)			
WATT METER (kW)			
HOUR METER			136
AMBIENT CONDITIONS (TEMP/HUMIDITY)			
OPERATOR COMMENTS:	Opened well 7.		

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

DATA	Date:11/1/97 TEST START	Test 1-6 TEST MIDPOINT	R.Cooper TEST END
SVE INLET FLOW (SCFM)	259	260	258
SVE INLET TEMP (F)	105	118	118
DILUTION AIR FLOW (SCFM)	121	100	112
DILUTION AIR TEMP (F)	96	90	90
DILUTION AIR PRESS (INCH WC)			
COMBINED INLET AIR FLOW (SCFM)	380	360	370
COMBINED INLET AIR TEMP (F)			
COMBINED INLET AIR PRESS (INCH WC)	0	0.5	0
OUTLET GAS FLOW (SCFM)	380	360	370
OUTLET GAS TEMP (F)	121	118	118
OUTLET GAS PRESS (INCH WC)	2	0.5	0.5
ADSORBER PRESS TOP (kPa)	-3.4	-3.6	-0.34
ADSORBER PRESS MID (kPa)	-1.8	-2.2	-0.24
ADSORBER PRESS BOTTTOM (kPa)	-0.4	-0.4	-0.6
DESORBER PRESS MID (kPa)	-0.4	-0.35	-0.35
DESORBER PRESS BOT (kPa)	-0.5	-0.46	-0.46
CONDENSER TEMP (F)	70	56	54
CHILLED WATER TEMP (F)	39.5	37.8	38
DILUTION AIR TO PDUs (SCFM)	4.5	4.75	4.5
TOTAL FLOW TÓ PDUs			
FEED GAS TEMP TO PDUs (F)	131	141	136
FEED GAS PRESS TO PDUs (INCH WC)			
PDU COOLING WATER INLET TEMP (F)			
PDU #1 COOLING WATER OUTLET TEMP (F)			
PDU #2 COOLING WATER OUTLET TEMP (F)			
PDU #1 COOLING WATER FLOW (GPM)			
PDU #2 COOLING WATER FLOW (GPM)			
PDU #1 PRESS DROP MID TO OUT (INCH WC)			
PDU #2 PRESS DROP MID TO OUT (INCH WC)			
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)			
SCRUBBER OUTLET PRESS (INCH WC)			
COOLING WATER TANK TEMP (F)	108	117	118
SCRUBBER LIQUID FLOW (GPM)			
SCRUBBER pH			
OHM SVE RETURN HEADER PRESS (INCH WC)			
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)			
BOOSTER BLOWER SUCTION PRESS (INCH WC)	-24	-24	-24
PDU #1 TEMP (F)	153	169.3	170
PDU #2 TEMP (F)	148	159.1	155
DESORBER TEMP MID (F)	277	229	226
DESORBER TEMP BOTTOM (F)	99	128	133
BOILER PRESS (PSIG)	65	70	70
SOLVENT STORAGE TANK LEVEL (INCH)			
INLET GAS FID READING (PPM)	1360	1550	1450
OUTLET GAS FID READING (PPM)	370	460	560
LEL METER (%)			
WATT METER (kW)			
HOUR METER			167
AMBIENT CONDITIONS (TEMP/HUMIDITY)			
OPERATOR COMMENTS:	Heat-taped PDU inlet piping. Believe bottom desorber T/C to be malfunctioning.		

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

	Date:11/6/97	Test 1-4A	R.Cooper
DATA	TEST START	TEST MIDPOINT	TEST END
SVE INLET FLOW (SCFM)	255	275	
SVE INLET TEMP (F)	105	92	
DILUTION AIR FLOW (SCFM)	149		
DILUTION AIR TEMP (F)	86	86	
DILUTION AIR PRESS (INCH WC)			
COMBINED INLET AIR FLOW (SCFM)	404		
COMBINED INLET AIR TEMP (F)			
COMBINED INLET AIR PRESS (INCH WC)	0	-1	
OUTLET GAS FLOW (SCFM)	404		
OUTLET GAS TEMP (F)			
OUTLET GAS PRESS (INCH WC)	-3	-7	
ADSORBER PRESS TOP (kPa)	-3.8	-3.5	
ADSORBER PRESS MID (kPa)	-1.8	-1.8	
ADSORBER PRESS BOTTTOM (kPa)	-0.2	-0.4	
DESORBER PRESS MID (kPa)	-4.4	-0.2	
DESORBER PRESS BOT (kPa)	-4.8	-0.4	
CONDENSER TEMP (F)	62	62	
CHILLED WATER TEMP (F)	42	39	
DILUTION AIR TO PDUs (SCFM)	4.5	3.55	
TOTAL FLOW TO PDUs			
FEED GAS TEMP TO PDUs (F)	123	123	
FEED GAS PRESS TO PDUs (INCH WC)	-11		
PDU COOLING WATER INLET TEMP (F)			
PDU #1 COOLING WATER OUTLET TEMP (F)			
PDU #2 COOLING WATER OUTLET TEMP (F)			
PDU #1 COOLING WATER FLOW (GPM)	1.5		
PDU #2 COOLING WATER FLOW (GPM)	0.5		
PDU #1 PRESS DROP MID TO OUT (INCH WC)	1.9		
PDU #2 PRESS DROP MID TO OUT (INCH WC)	2.5		
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)	14.25		
SCRUBBER OUTLET PRESS (INCH WC)	-11		
COOLING WATER TANK TEMP (F)	96	113	
SCRUBBER LIQUID FLOW (GPM)			
SCRUBBER pH			
OHM SVE RETURN HEADER PRESS (INCH WC)			
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)			
BOOSTER BLOWER SUCTION PRESS (INCH WC)	-16	-12	
PDU #1 TEMP (F)	206	208	
PDU #2 TEMP (F)	131	137	
DESORBER TEMP MID (F)	254	235	
DESORBER TEMP BOTTOM (F)	153	185	
BOILER PRESS (PSIG)	87	87	
SOLVENT STORAGE TANK LEVEL (INCH)			
INLET GAS FID READING (PPM)	1003	853	
OUTLET GAS FID READING (PPM)	57	52	
LEL METER (%)			
WATT METER (kW)			
HOUR METER			188.5
AMBIENT CONDITIONS (TEMP/HUMIDITY)			
OPERATOR COMMENTS:			

Replaced 11/32" desorber downcomer tubes with 9/32". Installed 3-15/16" wier plates in lower 3 stages of adsorber, to replace the 3-3/16" wier plates. Replaced flapper check valve at desorber inlet. Installed tallest wier plates in stages 5 and 6. Insulated top of desorber and heat-traced line from transfer pot to flapper valve. Installed 10" extension on return line from scrubber to adsorber.

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

	Date:11/17/97	Test 1-5A	R.Cooper
DATA	TEST START	TEST MIDPOINT	TEST END
SVE INLET FLOW (SCFM)	266	268	268
SVE INLET TEMP (F)	100	100	96
DILUTION AIR FLOW (SCFM)	130		
DILUTION AIR TEMP (F)	80	78	78
DILUTION AIR PRESS (INCH WC)	0.5	0.5	0.5
COMBINED INLET AIR FLOW (SCFM)	396	398	398
COMBINED INLET AIR TEMP (F)	98	89	90
COMBINED INLET AIR PRESS (INCH WC)	1.5	1	1
OUTLET GAS FLOW (SCFM)	406	392	396
OUTLET GAS TEMP (F)	92	90	89
OUTLET GAS PRESS (INCH WC)	-1	1	1
ADSORBER PRESS TOP (kPa)	3.6	3.8	3.8
ADSORBER PRESS MID (kPa)	1.6	1.7	1.7
ADSORBER PRESS BOTTTOM (kPa)	0.4	0.3	0.3
DESORBER PRESS MID (kPa)	0.8	0.7	0.7
DESORBER PRESS BOT (kPa)	0.5	0.6	0.6
CONDENSER TEMP (F)	52	52	52
CHILLED WATER TEMP (F)	39	38	38
DILUTION AIR TO PDUs (SCFM)	5	5	4.25
TOTAL FLOW TO PDUs			
FEED GAS TEMP TO PDUs (F)	124	127	127
FEED GAS PRESS TO PDUs (INCH WC)	-9	-8	-8
PDU COOLING WATER INLET TEMP (F)	110	118	117
PDU #1 COOLING WATER OUTLET TEMP (F)	100	118	117
PDU #2 COOLING WATER OUTLET TEMP (F)	115	120	118
PDU #1 COOLING WATER FLOW (GPM)	1.5	2	2
PDU #2 COOLING WATER FLOW (GPM)	1	1	1
PDU #1 PRESS DROP MID TO OUT (INCH WC)	4	4.5	4.5
PDU #2 PRESS DROP MID TO OUT (INCH WC)	4	4	4
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)	11	11	11
SCRUBBER OUTLET PRESS (INCH WC)	10	10	10
COOLING WATER TANK TEMP (F)	103	116	115
SCRUBBER LIQUID FLOW (GPM)	11.3	11	11.2
SCRUBBER pH	9.9	9.9	9.9
OHM SVE RETURN HEADER PRESS (INCH WC)	-18	-18	-18
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)	-8	-7	-7
BOOSTER BLOWER SUCTION PRESS (INCH WC)	-16	-16	-16
PDU #1 TEMP (F)	215	235	232
PDU #2 TEMP (F)	140	145	150
DESORBER TEMP MID (F)	218	221	232
DESORBER TEMP BOTTOM (F)	191	186	191
BOILER PRESS (PSIG)	70	70	67
SOLVENT STORAGE TANK LEVEL (INCH)			
INLET GAS FID READING (PPM)	1014	994	1020
OUTLET GAS FID READING (PPM)	95	120	120
LEL METER (%)			
WATT METER (kW)			
HOUR METER			244.5
AMBIENT CONDITIONS (TEMP/HUMIDITY)	low 70's clear	60's clear	low 60's
OPERATOR COMMENTS:	Increased cooling water flow to R1.		

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

DATA	Date:11/18/97 TEST START	Test 1-6A TEST MIDPOINT	R.Cooper TEST END
SVE INLET FLOW (SCFM)	266	266	267
SVE INLET TEMP (F)	102	103	103
DILUTION AIR FLOW (SCFM)	134	131	
DILUTION AIR TEMP (F)	962	94	94
DILUTION AIR PRESS (INCH WC)	0	0	0
COMBINED INLET AIR FLOW (SCFM)	400	397	398
COMBINED INLET AIR TEMP (F)	100	103	103
COMBINED INLET AIR PRESS (INCH WC)	0.5	0.5	0.5
OUTLET GAS FLOW (SCFM)	400	396	396
OUTLET GAS TEMP (F)	106	106	106
OUTLET GAS PRESS (INCH WC)	0.5	0.5	0.5
ADSORBER PRESS TOP (kPa)	3.8	3.6	3.6
ADSORBER PRESS MID (kPa)	1.8	1.8	1.8
ADSORBER PRESS BOTTTOM (kPa)	0.3	0.3	0.3
DESORBER PRESS MID (kPa)	0.8	0.8	0.7
DESORBER PRESS BOT (kPa)	0.6	0.7	0.7
CONDENSER TEMP (F)	70	68	70
CHILLED WATER TEMP (F)	50	49	50
DILUTION AIR TO PDUs (SCFM)	5.5	5.5	5.5
TOTAL FLOW TO PDUs			
FEED GAS TEMP TO PDUs (F)	142	141	142
FEED GAS PRESS TO PDUs (INCH WC)	10	11	10
PDU COOLING WATER INLET TEMP (F)	120	120	120
PDU #1 COOLING WATER OUTLET TEMP (F)	120	118	118
PDU #2 COOLING WATER OUTLET TEMP (F)	125	122	122
PDU #1 COOLING WATER FLOW (GPM)	2	2	2
PDU #2 COOLING WATER FLOW (GPM)	2	1	1
PDU #1 PRESS DROP MID TO OUT (INCH WC)	3	3	2.5
PDU #2 PRESS DROP MID TO OUT (INCH WC)	2.5	2.5	2.5
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)	11	11	10
SCRUBBER OUTLET PRESS (INCH WC)	10	10	10
COOLING WATER TANK TEMP (F)	115	117	116
SCRUBBER LIQUID FLOW (GPM)	9.95	10.6	9.95
SCRUBBER pH	9.66	8.72	9.69
OHM SVE RETURN HEADER PRESS (INCH WC)	20	20	20
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)	6	7	7
BOOSTER BLOWER SUCTION PRESS (INCH WC)	13	16	16
PDU #1 TEMP (F)	254	247	248
PDU #2 TEMP (F)	157	156	158
DESORBER TEMP MID (F)	243	243	247
DESORBER TEMP BOTTOM (F)	187	191	191
BOILER PRESS (PSIG)	67	67	67
SOLVENT STORAGE TANK LEVEL (INCH)			
INLET GAS FID READING (PPM)	1032	1011	1022
OUTLET GAS FID READING (PPM)	267	262	265
LEL METER (%)			
WATT METER (kW)			
HOUR METER			268.5
AMBIENT CONDITIONS (TEMP/HUMIDITY)	high 60's clear	mid 70's clear	mid 70's clear
OPERATOR COMMENTS:			

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

	Date:11/20/97	Test 2-6	R.Cooper
DATA	TEST START	TEST MIDPOINT	TEST END
SVE INLET FLOW (SCFM)	261	261	263
SVE INLET TEMP (F)	104	104	105
DILUTION AIR FLOW (SCFM)	124	124	123
DILUTION AIR TEMP (F)	90	92	92
DILUTION AIR PRESS (INCH WC)	0	0	0
COMBINED INLET AIR FLOW (SCFM)	385	385	386
COMBINED INLET AIR TEMP (F)	100	104	106
COMBINED INLET AIR PRESS (INCH WC)	0.5	0.5	0.5
OUTLET GAS FLOW (SCFM)	385	385	386
OUTLET GAS TEMP (F)	103	104	104
OUTLET GAS PRESS (INCH WC)	0	0	0
ADSORBER PRESS TOP (kPa)	3.8	3.8	3.8
ADSORBER PRESS MID (kPa)	1.6	1.6	1.6
ADSORBER PRESS BOTTTOM (kPa)	0.25	0.25	0.25
DESORBER PRESS MID (kPa)	0.1	0.1	0.1
DESORBER PRESS BOT (kPa)	118	0.18	0.18
CONDENSER TEMP (F)	65	68	68
CHILLED WATER TEMP (F)	48	50	49
DILUTION AIR TO PDUs (SCFM)	na	-	na
TOTAL FLOW TO PDUs			
FEED GAS TEMP TO PDUs (F)	na	-	na
FEED GAS PRESS TO PDUs (INCH WC)	na	-	na
PDU COOLING WATER INLET TEMP (F)	na	-	na
PDU #1 COOLING WATER OUTLET TEMP (F)	na	-	na
PDU #2 COOLING WATER OUTLET TEMP (F)	na	-	na
PDU #1 COOLING WATER FLOW (GPM)	na	-	na
PDU #2 COOLING WATER FLOW (GPM)	na	-	na
PDU #1 PRESS DROP MID TO OUT (INCH WC)	na	-	na
PDU #2 PRESS DROP MID TO OUT (INCH WC)	na	-	na
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)	na	-	na
SCRUBBER OUTLET PRESS (INCH WC)	na	-	na
COOLING WATER TANK TEMP (F)	na	-	na
SCRUBBER LIQUID FLOW (GPM)	na	-	na
SCRUBBER pH	na	-	na
OHM SVE RETURN HEADER PRESS (INCH WC)	20	20	20
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)	8	8	8
BOOSTER BLOWER SUCTION PRESS (INCH WC)	16	16	16
PDU #1 TEMP (F)	na	na	na
PDU #2 TEMP (F)	na	na	na
DESORBER TEMP MID (F)	264	222	212
DESORBER TEMP BOTTOM (F)	180	200	243
BOILER PRESS (PSIG)	67	67	67
SOLVENT STORAGE TANK LEVEL (INCH)			8.25
INLET GAS FID READING (PPM)	966	968	963
OUTLET GAS FID READING (PPM)	590	585	572
LEL METER (%)			
WATT METER (kW)			
HOUR METER			316.5
AMBIENT CONDITIONS (TEMP/HUMIDITY)	mid 60's foggy	60's - 70 clear	low 70's clear
OPERATOR COMMENTS:	Concentrate and condense only.		

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

	Date:12/19/97	Test 2-5	R.Cooper
DATA	**TEST START**	**TEST MIDPOINT**	**TEST END**
SVE INLET FLOW (SCFM)	263	262	
SVE INLET TEMP (F)	84.6	85	
DILUTION AIR FLOW (SCFM)	139	142	
DILUTION AIR TEMP (F)	78	78	
DILUTION AIR PRESS (INCH WC)			
COMBINED INLET AIR FLOW (SCFM)	402	404	
COMBINED INLET AIR TEMP (F)	92	92	
COMBINED INLET AIR PRESS (INCH WC)			
OUTLET GAS FLOW (SCFM)			
OUTLET GAS TEMP (F)	80	82	
OUTLET GAS PRESS (INCH WC)	0.5	0.5	
ADSORBER PRESS TOP (kPa)	4.4	4.4	
ADSORBER PRESS MID (kPa)	2.3	2.3	
ADSORBER PRESS BOTTTOM (kPa)	0.6	0.6	
DESORBER PRESS MID (kPa)	0.24	0.24	
DESORBER PRESS BOT (kPa)	0.2	0.2	
CONDENSER TEMP (F)	50	50	
CHILLED WATER TEMP (F)	38	0.39	
DILUTION AIR TO PDUs (SCFM)	na	na	
TOTAL FLOW TO PDUs			
FEED GAS TEMP TO PDUs (F)	na	na	
FEED GAS PRESS TO PDUs (INCH WC)	na	na	
PDU COOLING WATER INLET TEMP (F)	na	na	
PDU #1 COOLING WATER OUTLET TEMP (F)	na	na	
PDU #2 COOLING WATER OUTLET TEMP (F)	na	na	
PDU #1 COOLING WATER FLOW (GPM)	na	na	
PDU #2 COOLING WATER FLOW (GPM)	na	na	
PDU #1 PRESS DROP MID TO OUT (INCH WC)	na	na	
PDU #2 PRESS DROP MID TO OUT (INCH WC)	na	na	
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)	na	na	
SCRUBBER OUTLET PRESS (INCH WC)	na	na	
COOLING WATER TANK TEMP (F)	na	na	
SCRUBBER LIQUID FLOW (GPM)	na	na	
SCRUBBER pH	na	na	
OHM SVE RETURN HEADER PRESS (INCH WC)	30	30	
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)	12	12	
BOOSTER BLOWER SUCTION PRESS (INCH WC)	18	18	
PDU #1 TEMP (F)	na	na	
PDU #2 TEMP (F)	na	na	
DESORBER TEMP MID (F)	255	217	
DESORBER TEMP BOTTOM (F)	191	173	
BOILER PRESS (PSIG)	65	65	
SOLVENT STORAGE TANK LEVEL (INCH)			10
INLET GAS FID READING (PPM)	353	320	
OUTLET GAS FID READING (PPM)	160	70	
LEL METER (%)			
WATT METER (kW)			
HOUR METER			733.5
AMBIENT CONDITIONS (TEMP/HUMIDITY)	cool clear	cool clear	
OPERATOR COMMENTS:			

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

	Date:1/7/98 13:00	Test 2-3	M.Gray
DATA	TEST START	TEST MIDPOINT	TEST END
SVE INLET FLOW (SCFM)	209	208	215
SVE INLET TEMP (F)	119	112	108
DILUTION AIR FLOW (SCFM)	210	210	210
DILUTION AIR TEMP (F)	84	80	78
DILUTION AIR PRESS (INCH WC)	-1	-1	-1
COMBINED INLET AIR FLOW (SCFM)	400	400	425
COMBINED INLET AIR TEMP (F)	100	97	92
COMBINED INLET AIR PRESS (INCH WC)	-1.5	-105	-1.2
OUTLET GAS FLOW (SCFM)	425	424	433
OUTLET GAS TEMP (F)	100	93.3	87.1
OUTLET GAS PRESS (INCH WC)	-505	-5.5	-6
ADSORBER PRESS TOP (kPa)	-4.4	-4.4	-4.4
ADSORBER PRESS MID (kPa)	-2.25	-2.25	-2.25
ADSORBER PRESS BOTTTOM (kPa)	-0.3	-0.3	-0.3
DESORBER PRESS MID (kPa)	-0.3	-0.3	-0.3
DESORBER PRESS BOT (kPa)	-0.2	-0.2	-0.2
CONDENSER TEMP (F)	70	66.6	62.1
CHILLED WATER TEMP (F)	38	35.3	
DILUTION AIR TO PDUs (SCFM)	na	na	na
TOTAL FLOW TO PDUs			
FEED GAS TEMP TO PDUs (F)	na	na	na
FEED GAS PRESS TO PDUs (INCH WC)	na	na	na
PDU COOLING WATER INLET TEMP (F)	na	na	na
PDU #1 COOLING WATER OUTLET TEMP (F)	na	na	na
PDU #2 COOLING WATER OUTLET TEMP (F)	na	na	na
PDU #1 COOLING WATER FLOW (GPM)	na	na	na
PDU #2 COOLING WATER FLOW (GPM)	na	na	na
PDU #1 PRESS DROP MID TO OUT (INCH WC)	na	na	na
PDU #2 PRESS DROP MID TO OUT (INCH WC)	na	na	na
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)	na	na	na
SCRUBBER OUTLET PRESS (INCH WC)	na	na	na
COOLING WATER TANK TEMP (F)	na	na	na
SCRUBBER LIQUID FLOW (GPM)	na	na	na
SCRUBBER pH	na	na	na
OHM SVE RETURN HEADER PRESS (INCH WC)	-30	-30	-30
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)	-15	-15	-15
BOOSTER BLOWER SUCTION PRESS (INCH WC)	-18	-16	-16
PDU #1 TEMP (F)	na	na	na
PDU #2 TEMP (F)	na	na	na
DESORBER TEMP MID (F)	262	247.8	264
DESORBER TEMP BOTTOM (F)	222	232.6	238
BOILER PRESS (PSIG)	45	45	45
SOLVENT STORAGE TANK LEVEL (INCH)	11		11.25
INLET GAS FID READING (PPM)	1420	1440	1420
OUTLET GAS FID READING (PPM)	306	405	530
LEL METER (%)			
WATT METER (kW)			
HOUR METER			757
AMBIENT CONDITIONS (TEMP/HUMIDITY)	70 /clear	70 / clear	60/hi clouds
OPERATOR COMMENTS:	Installed Teflon flapper valve, 1"vent on top of desorber		

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

	Date:1/7/98 17:27	Test 3-1	M.Gray
DATA	TEST START	TEST MIDPOINT	TEST END
SVE INLET FLOW (SCFM)	215	210	220
SVE INLET TEMP (F)	108	105	106
DILUTION AIR FLOW (SCFM)	210	205	180
DILUTION AIR TEMP (F)	78	78	74
DILUTION AIR PRESS (INCH WC)	-1	-1	-1
COMBINED INLET AIR FLOW (SCFM)	425	415	410
COMBINED INLET AIR TEMP (F)	92	90.4	90
COMBINED INLET AIR PRESS (INCH WC)	-1.5	-1.4	-1.2
OUTLET GAS FLOW (SCFM)	433	422	420
OUTLET GAS TEMP (F)	87.1	92	88.2
OUTLET GAS PRESS (INCH WC)	-6	-6	-5.7
ADSORBER PRESS TOP (kPa)	-4.4	-4.4	-4.4
ADSORBER PRESS MID (kPa)	-2.3	-2.3	-2.3
ADSORBER PRESS BOTTTOM (kPa)	-0.3	-0.3	-0.3
DESORBER PRESS MID (kPa)	-0.4	-0.4	-0.7
DESORBER PRESS BOT (kPa)	-0.28	-0.28	-0.5
CONDENSER TEMP (F)	60.6	134	92
CHILLED WATER TEMP (F)	34.5	no water	38.3
DILUTION AIR TO PDUs (SCFM)	5.1	5	4.5
TOTAL FLOW TO PDUs			
FEED GAS TEMP TO PDUs (F)	127.5	135.8	132.8
FEED GAS PRESS TO PDUs (INCH WC)			
PDU COOLING WATER INLET TEMP (F)	126	116	122
PDU #1 COOLING WATER OUTLET TEMP (F)	116	116	118
PDU #2 COOLING WATER OUTLET TEMP (F)	125	124	126
PDU #1 COOLING WATER FLOW (GPM)	3	3	3
PDU #2 COOLING WATER FLOW (GPM)	2.5	1.5	1.6
PDU #1 PRESS DROP MID TO OUT (INCH WC)	1.5	2	2
PDU #2 PRESS DROP MID TO OUT (INCH WC)	1.5	2	2.25
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)	14	14	14
SCRUBBER OUTLET PRESS (INCH WC)	-12	-12	-12
COOLING WATER TANK TEMP (F)	117.1	113.3	114.7
SCRUBBER LIQUID FLOW (GPM)	9.4	12.7	9.5
SCRUBBER pH	9.99	9.94	9.96
OHM SVE RETURN HEADER PRESS (INCH WC)	-30	-30	-30
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)	-15	-15	-15
BOOSTER BLOWER SUCTION PRESS (INCH WC)	-16	-16	-16
PDU #1 TEMP (F)	241	255.9	269
PDU #2 TEMP (F)	152	159.5	160.5
DESORBER TEMP MID (F)	262.7	277.3	262
DESORBER TEMP BOTTOM (F)	237.8	238	235
BOILER PRESS (PSIG)	45	45	45
SOLVENT STORAGE TANK LEVEL (INCH)	11.25	11.25	11.25
INLET GAS FID READING (PPM)	1420	1460	1450
OUTLET GAS FID READING (PPM)	532	517	390
LEL METER (%)			
WATT METER (kW)			
HOUR METER			761
AMBIENT CONDITIONS (TEMP/HUMIDITY)	60 dark	59 dark	58 dark
OPERATOR COMMENTS:			

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

	Date:1/8/98 08:30	Test 2-4	M.Gray
DATA	**TEST START**	**TEST MIDPOINT**	**TEST END**
SVE INLET FLOW (SCFM)	262	255	256
SVE INLET TEMP (F)	91	97.9	98.7
DILUTION AIR FLOW (SCFM)	65	70	70
DILUTION AIR TEMP (F)	76	80	80
DILUTION AIR PRESS (INCH WC)	-0.5	-0.5	-0.5
COMBINED INLET AIR FLOW (SCFM)	337	325	326
COMBINED INLET AIR TEMP (F)	82	92	91
COMBINED INLET AIR PRESS (INCH WC)	-0.8	-0.9	-0.9
OUTLET GAS FLOW (SCFM)	421	415	415
OUTLET GAS TEMP (F)	82.4	96	94
OUTLET GAS PRESS (INCH WC)	-6	-6	-5.5
ADSORBER PRESS TOP (kPa)	-4.4	-4.4	-4.4
ADSORBER PRESS MID (kPa)	-2.2	-2.2	-2.25
ADSORBER PRESS BOTTTOM (kPa)	-0.25	-0.25	-0.2
DESORBER PRESS MID (kPa)	-0.25	-0.2	-0.2
DESORBER PRESS BOT (kPa)	-0.18	-0.17	-0.14
CONDENSER TEMP (F)	75	80	80
CHILLED WATER TEMP (F)	35.6	34.5	34.6
DILUTION AIR TO PDUs (SCFM)	na	na	na
TOTAL FLOW TO PDUs			
FEED GAS TEMP TO PDUs (F)	na	na	na
FEED GAS PRESS TO PDUs (INCH WC)	na	na	na
PDU COOLING WATER INLET TEMP (F)	na	na	na
PDU #1 COOLING WATER OUTLET TEMP (F)	na	na	na
PDU #2 COOLING WATER OUTLET TEMP (F)	na	na	na
PDU #1 COOLING WATER FLOW (GPM)	na	na	na
PDU #2 COOLING WATER FLOW (GPM)	na	na	na
PDU #1 PRESS DROP MID TO OUT (INCH WC)	na	na	na
PDU #2 PRESS DROP MID TO OUT (INCH WC)	na	na	na
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)	na	na	na
SCRUBBER OUTLET PRESS (INCH WC)	na	na	na
COOLING WATER TANK TEMP (F)	na	na	na
SCRUBBER LIQUID FLOW (GPM)	na	na	na
SCRUBBER pH	na	na	na
OHM SVE RETURN HEADER PRESS (INCH WC)	-30	-30	-30
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)	-15	-15	-15
BOOSTER BLOWER SUCTION PRESS (INCH WC)	-20	-20	-20
PDU #1 TEMP (F)	na	na	na
PDU #2 TEMP (F)	na	na	na
DESORBER TEMP MID (F)	268	262	263
DESORBER TEMP BOTTOM (F)	235	241	243
BOILER PRESS (PSIG)	45	45	45
SOLVENT STORAGE TANK LEVEL (INCH)	11.5	11.5	11.75
INLET GAS FID READING (PPM)	1900	1820	1860
OUTLET GAS FID READING (PPM)	375	638	639
LEL METER (%)			
WATT METER (kW)			
HOUR METER	771		
AMBIENT CONDITIONS (TEMP/HUMIDITY)	55 scattered clouds	61	75.2 cloudy
OPERATOR COMMENTS:			

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

	Date:1/8/98 13:00	Test 2-2	M.Gray
DATA	TEST START	TEST MIDPOINT	TEST END
SVE INLET FLOW (SCFM)	147	149	149
SVE INLET TEMP (F)	93.1	94	90.1
DILUTION AIR FLOW (SCFM)	174	168	165
DILUTION AIR TEMP (F)	83	84	80
DILUTION AIR PRESS (INCH WC)	-1	-1	-1
COMBINED INLET AIR FLOW (SCFM)	321	317	314
COMBINED INLET AIR TEMP (F)	86	86	84
COMBINED INLET AIR PRESS (INCH WC)	-2	-2	-1.8
OUTLET GAS FLOW (SCFM)	395	391	388
OUTLET GAS TEMP (F)	92.3	94.2	88.1
OUTLET GAS PRESS (INCH WC)	-4.5	-4.5	-4.5
ADSORBER PRESS TOP (kPa)	-4.4	-4.4	-4.4
ADSORBER PRESS MID (kPa)	-2.3	-2.3	-2.3
ADSORBER PRESS BOTTTOM (kPa)	-0.4	-0.4	-0.4
DESORBER PRESS MID (kPa)	-0.38	-0.38	-0.35
DESORBER PRESS BOT (kPa)	-0.26	-0.26	-0.26
CONDENSER TEMP (F)	80	82	78
CHILLED WATER TEMP (F)	38	34.3	35.1
DILUTION AIR TO PDUs (SCFM)	na	na	na
TOTAL FLOW TO PDUs			
FEED GAS TEMP TO PDUs (F)	na	na	na
FEED GAS PRESS TO PDUs (INCH WC)	na	na	na
PDU COOLING WATER INLET TEMP (F)	na	na	na
PDU #1 COOLING WATER OUTLET TEMP (F)	na	na	na
PDU #2 COOLING WATER OUTLET TEMP (F)	na	na	na
PDU #1 COOLING WATER FLOW (GPM)	na	na	na
PDU #2 COOLING WATER FLOW (GPM)	na	na	na
PDU #1 PRESS DROP MID TO OUT (INCH WC)	na	na	na
PDU #2 PRESS DROP MID TO OUT (INCH WC)	na	na	na
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)	na	na	na
SCRUBBER OUTLET PRESS (INCH WC)	na	na	na
COOLING WATER TANK TEMP (F)	na	na	na
SCRUBBER LIQUID FLOW (GPM)	na	na	na
SCRUBBER pH	na	na	na
OHM SVE RETURN HEADER PRESS (INCH WC)	-28	-28	-28
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)	-14	-14	-14
BOOSTER BLOWER SUCTION PRESS (INCH WC)	-20	-20	-20
PDU #1 TEMP (F)	na	na	na
PDU #2 TEMP (F)	na	na	na
DESORBER TEMP MID (F)	261	261.8	258.6
DESORBER TEMP BOTTOM (F)	241	240.7	239.6
BOILER PRESS (PSIG)	45	45	45
SOLVENT STORAGE TANK LEVEL (INCH)	11.75	11.875	12
INLET GAS FID READING (PPM)	1100	1060	1170
OUTLET GAS FID READING (PPM)	450	460	388
LEL METER (%)			
WATT METER (kW)			
HOUR METER	778		
AMBIENT CONDITIONS (TEMP/HUMIDITY)	75 cloudy	87 cloudy	80 pc
OPERATOR COMMENTS:			

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

DATA	Date:1/17/98 Steady-State Tests	Date: 1/18/98 Steady-State Tests	Date: 1/19/98 Steady-State Tests
SVE INLET FLOW (SCFM)	267	241	239
SVE INLET TEMP (F)	95.8	101	93
DILUTION AIR FLOW (SCFM)	157	118	105
DILUTION AIR TEMP (F)	65	88	80
DILUTION AIR PRESS (INCH WC)			
COMBINED INLET AIR FLOW (SCFM)	410	359	332
COMBINED INLET AIR TEMP (F)	88.5	90	87
COMBINED INLET AIR PRESS (INCH WC)	-2	-2	-1.5
OUTLET GAS FLOW (SCFM)	410	426	397
OUTLET GAS TEMP (F)	88.5	90	84.7
OUTLET GAS PRESS (INCH WC)	-5	-7	-6.5
ADSORBER PRESS TOP (kPa)	-4.5	-4.6	-4.5
ADSORBER PRESS MID (kPa)	-2.25	-2.4	-2.35
ADSORBER PRESS BOTTTOM (kPa)	-0.5	-0.53	-0.4
DESORBER PRESS MID (kPa)	-0.5	-0.56	-0.5
DESORBER PRESS BOT (kPa)	-0.34	-0.45	-0.36
CONDENSER TEMP (F)	80	82	80
CHILLED WATER TEMP (F)	38.6	36.8	37
DILUTION AIR TO PDUs (SCFM)	4	4.75	0
TOTAL FLOW TO PDUs	6	6.25	4
FEED GAS TEMP TO PDUs (F)	110.1	127.7	123
FEED GAS PRESS TO PDUs (INCH WC)	-14	-12.3	-6
PDU COOLING WATER INLET TEMP (F)	123	123	120
PDU #1 COOLING WATER OUTLET TEMP (F)	110	114	108
PDU #2 COOLING WATER OUTLET TEMP (F)	120	122	118
PDU #1 COOLING WATER FLOW (GPM)	3	3.5	3.5
PDU #2 COOLING WATER FLOW (GPM)	1.5	2	2
PDU #1 PRESS DROP MID TO OUT (INCH WC)	1	2.8	6.4
PDU #2 PRESS DROP MID TO OUT (INCH WC)	2	2.8	3.8
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)	3	14	14
SCRUBBER OUTLET PRESS (INCH WC)	-12	-12	-12
COOLING WATER TANK TEMP (F)	119.1	116.1	114
SCRUBBER LIQUID FLOW (GPM)	3	196.8	17.4
SCRUBBER pH	10.02	9.94	9.87
OHM SVE RETURN HEADER PRESS (INCH WC)	-30	-30	-30
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)	-15	-17	-15
BOOSTER BLOWER SUCTION PRESS (INCH WC)	-35	-34	-35
PDU #1 TEMP (F)	182.5	204.8	208.2
PDU #2 TEMP (F)	141.5	150.2	144.2
DESORBER TEMP MID (F)	260.5	274.8	271.8
DESORBER TEMP BOTTOM (F)	237.8	224.6	238.7
BOILER PRESS (PSIG)	49	48	48
SOLVENT STORAGE TANK LEVEL (INCH)	13	14.25	14.75
INLET GAS FID READING (PPM)	bad order	719	890
OUTLET GAS FID READING (PPM)	bad order	240	170
LEL METER (%)	<1	6	8
WATT METER (kW)	266	306	341
HOUR METER	795	819	837
AMBIENT CONDITIONS (TEMP/HUMIDITY)	65	70	63 cloudy light rain
OPERATOR COMMENTS:	Begin Steady-State Tests. J.Ferrell Install watt meter. Wells 2,3,6,7	M.Gray	M.Gray

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

DATA	Date:1/20/98 Steady-State Tests	Date:1/21/98 Steady-State Tests	Date:1/22/98 Steady-State Tests
SVE INLET FLOW (SCFM)	244	243	240
SVE INLET TEMP (F)	106	104	100
DILUTION AIR FLOW (SCFM)	105	105	57
DILUTION AIR TEMP (F)	80	80	80
DILUTION AIR PRESS (INCH WC)	-	-	-
COMBINED INLET AIR FLOW (SCFM)	349	348	297
COMBINED INLET AIR TEMP (F)	96	93	92
COMBINED INLET AIR PRESS (INCH WC)	-1.6	-1.6	-1
OUTLET GAS FLOW (SCFM)	414	434	410
OUTLET GAS TEMP (F)	99.1	91.9	95.8
OUTLET GAS PRESS (INCH WC)	-6	-5.5	-2
ADSORBER PRESS TOP (kPa)	-4.4	-4.4	-4
ADSORBER PRESS MID (kPa)	-2.2	-2.25	-1.9
ADSORBER PRESS BOTTTOM (kPa)	-0.4	-0.4	-0.2
DESORBER PRESS MID (kPa)	-0.56	-0.5	-0.46
DESORBER PRESS BOT (kPa)	-0.41	0.36	-0.32
CONDENSER TEMP (F)	84	84	82
CHILLED WATER TEMP (F)	38.6	36.4	32.7
DILUTION AIR TO PDUs (SCFM)	3	4.5	4.5
TOTAL FLOW TO PDUs	6	6	6
FEED GAS TEMP TO PDUs (F)	132.4	133.2	128.2
FEED GAS PRESS TO PDUs (INCH WC)	-8	-10.5	-11
PDU COOLING WATER INLET TEMP (F)	120	116	126
PDU #1 COOLING WATER OUTLET TEMP (F)	110	105	106
PDU #2 COOLING WATER OUTLET TEMP (F)	118	116	116
PDU #1 COOLING WATER FLOW (GPM)	3.5	3	3
PDU #2 COOLING WATER FLOW (GPM)	1.5	1.5	1.5
PDU #1 PRESS DROP MID TO OUT (INCH WC)	4	3.5	3
PDU #2 PRESS DROP MID TO OUT (INCH WC)	4	2.5	2.4
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)	14.1	13.2	12.6
SCRUBBER OUTLET PRESS (INCH WC)	-12	-12	-10.5
COOLING WATER TANK TEMP (F)	111.8	110.4	115.1
SCRUBBER LIQUID FLOW (GPM)	16.6	9.4	2.5
SCRUBBER pH	9.8	10.33	9.38
OHM SVE RETURN HEADER PRESS (INCH WC)	-34	-34	-35
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)	-15	-15	-10
BOOSTER BLOWER SUCTION PRESS (INCH WC)	-35	-35	-36
PDU #1 TEMP (F)	194.2	193.4	194.7
PDU #2 TEMP (F)	149.3	152.4	148.8
DESORBER TEMP MID (F)	265.4	264.7	265.4
DESORBER TEMP BOTTOM (F)	223	241.7	239.4
BOILER PRESS (PSIG)	49	49	49
SOLVENT STORAGE TANK LEVEL (INCH)	15.75	16.125	16.75
INLET GAS FID READING (PPM)	980	930	900
OUTLET GAS FID READING (PPM)	216	187	147
LEL METER (%)	6	2	2
WATT METER (kW)	381	423	464
HOUR METER	853	871.5	891.6
AMBIENT CONDITIONS (TEMP/HUMIDITY)	70 pc	70 clear	60 clean
OPERATOR COMMENTS:	M.Gray	M.Gray	Start sampling M.Gray

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

DATA	Date:1/22/98 Steady-State Tests	Date:1/23/98 Steady-State Tests	Date:1/24/98 Steady-State Tests
SVE INLET FLOW (SCFM)	243	241	247
SVE INLET TEMP (F)	106	108	113
DILUTION AIR FLOW (SCFM)	75	75	75
DILUTION AIR TEMP (F)	80	80	85
DILUTION AIR PRESS (INCH WC)	-	-	-
COMBINED INLET AIR FLOW (SCFM)	318	316	322
COMBINED INLET AIR TEMP (F)	96	98	102
COMBINED INLET AIR PRESS (INCH WC)	-1	-1	-1.1
OUTLET GAS FLOW (SCFM)	416	412	388
OUTLET GAS TEMP (F)	94.1	96.2	99.5
OUTLET GAS PRESS (INCH WC)	-3.5	-3	-3.6
ADSORBER PRESS TOP (kPa)	-4.2	-4.15	-4.25
ADSORBER PRESS MID (kPa)	-2.1	-2.05	-2.1
ADSORBER PRESS BOTTTOM (kPa)	-0.3	-0.29	-0.3
DESORBER PRESS MID (kPa)	-0.48	-0.5	-0.5
DESORBER PRESS BOT (kPa)	-0.34	-0.4	-0.32
CONDENSER TEMP (F)	82	90	89
CHILLED WATER TEMP (F)	36	37	34.6
DILUTION AIR TO PDUs (SCFM)	4.5	4.5	4
TOTAL FLOW TO PDUs	6	6	6
FEED GAS TEMP TO PDUs (F)	134	133	137.8
FEED GAS PRESS TO PDUs (INCH WC)	-10.75	-9.4	-8.5
PDU COOLING WATER INLET TEMP (F)	116	118	121
PDU #1 COOLING WATER OUTLET TEMP (F)	110	105	104
PDU #2 COOLING WATER OUTLET TEMP (F)	116	110	110
PDU #1 COOLING WATER FLOW (GPM)	3	3	3
PDU #2 COOLING WATER FLOW (GPM)	1.5	1.5	1.5
PDU #1 PRESS DROP MID TO OUT (INCH WC)	2.8	2.5	4.7
PDU #2 PRESS DROP MID TO OUT (INCH WC)	2.8	2.3	4
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)	13	12.7	12.9
SCRUBBER OUTLET PRESS (INCH WC)	-11	-11	-11
COOLING WATER TANK TEMP (F)	110.5	113.3	114.9
SCRUBBER LIQUID FLOW (GPM)	2.5	0.67	0.85
SCRUBBER pH	9.16	8.33	10.82
OHM SVE RETURN HEADER PRESS (INCH WC)	-35	-34	-15
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)	-12	-12	-13
BOOSTER BLOWER SUCTION PRESS (INCH WC)	-38	-35	-20
PDU #1 TEMP (F)	197.4	195.5	206.2
PDU #2 TEMP (F)	152.8	151.5	156.4
DESORBER TEMP MID (F)	265.5	270.8	277.6
DESORBER TEMP BOTTOM (F)	242.3	241.2	249.2
BOILER PRESS (PSIG)	49	55	55
SOLVENT STORAGE TANK LEVEL (INCH)	17	17.75	18.125
INLET GAS FID READING (PPM)	940	940	950
OUTLET GAS FID READING (PPM)	100	130	90
LEL METER (%)	3	2	3
WATT METER (kW)	472	516	573
HOUR METER	895.8	918.4	942.3
AMBIENT CONDITIONS (TEMP/HUMIDITY)	70 clear	70 clear	75 clear
OPERATOR COMMENTS:	Finish sampling. M.Gray	M.Gray Shut-off well 6.	Began using strip steam. 0.2 gph water usage. M.Gray

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

DATA	Date:1/25/98 Steady-State Tests	Date:1/26/98 Steady-State Tests	Date:1/26/98 Steady-State Tests
SVE INLET FLOW (SCFM)	288	295	280
SVE INLET TEMP (F)	97.2	112	100
DILUTION AIR FLOW (SCFM)	71	66	71
DILUTION AIR TEMP (F)	84	89	80
DILUTION AIR PRESS (INCH WC)	0	0	0
COMBINED INLET AIR FLOW (SCFM)	359	361	351
COMBINED INLET AIR TEMP (F)	93	103	90
COMBINED INLET AIR PRESS (INCH WC)	-1.2	-1.2	-1.2
OUTLET GAS FLOW (SCFM)	436	435	445
OUTLET GAS TEMP (F)	98	103	89
OUTLET GAS PRESS (INCH WC)	-3.5	-3.5	-3.5
ADSORBER PRESS TOP (kPa)	-4.2	-4.2	-4.2
ADSORBER PRESS MID (kPa)	-2.1	-2.1	-2.1
ADSORBER PRESS BOTTTOM (kPa)	-0.3	-0.25	-0.25
DESORBER PRESS MID (kPa)	-0.58	-0.45	-0.44
DESORBER PRESS BOT (kPa)	-0.22	-0.26	-0.26
CONDENSER TEMP (F)	88	90	88
CHILLED WATER TEMP (F)	37.7	35.6	36.4
DILUTION AIR TO PDUs (SCFM)	3.5	4	2.5
TOTAL FLOW TO PDUs	5.5	6	4.5
FEED GAS TEMP TO PDUs (F)	139.9	139.7	65.3
FEED GAS PRESS TO PDUs (INCH WC)	-6.5	-8.5	-7
PDU COOLING WATER INLET TEMP (F)	116	124	111
PDU #1 COOLING WATER OUTLET TEMP (F)	106	109	105
PDU #2 COOLING WATER OUTLET TEMP (F)	110	110	110
PDU #1 COOLING WATER FLOW (GPM)	3	3	3
PDU #2 COOLING WATER FLOW (GPM)	0.75	0.75	0.75
PDU #1 PRESS DROP MID TO OUT (INCH WC)	5.6	0.1	2.5
PDU #2 PRESS DROP MID TO OUT (INCH WC)	3	0.2	6
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)	12.8	12.6	13.8
SCRUBBER OUTLET PRESS (INCH WC)	-11	-11	-11
COOLING WATER TANK TEMP (F)	111.7	117.5	110.7
SCRUBBER LIQUID FLOW (GPM)	0.92	1.06	1.01
SCRUBBER pH	11.87	8.62	11.92
OHM SVE RETURN HEADER PRESS (INCH WC)	-15	-32	-32
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)	-13	-13	-13
BOOSTER BLOWER SUCTION PRESS (INCH WC)	-22	-32	-32
PDU #1 TEMP (F)	210.7	207.8	208
PDU #2 TEMP (F)	158.4	157.5	148.7
DESORBER TEMP MID (F)	290.8	295	295.7
DESORBER TEMP BOTTOM (F)	251.1	240.8	238.1
BOILER PRESS (PSIG)	55	50	50
SOLVENT STORAGE TANK LEVEL (INCH)	19.25	20.125	20.5
INLET GAS FID READING (PPM)	840	1150	1200
OUTLET GAS FID READING (PPM)	46	100	66
LEL METER (%)	8	4	3
WATT METER (kW)	626	688	698
HOUR METER	964.2	990.5	994.5
AMBIENT CONDITIONS (TEMP/HUMIDITY)	70 clear	70 hazy	60 hazy
OPERATOR COMMENTS:	M.Gray	Start sampling. 0.15 gph water use. M.Gray	Finish sampling.

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

DATA	Date:1/27/98 Steady-State Tests	Date:1/28/98 Steady-State Tests	Date:1/29/98 Steady-State Tests
SVE INLET FLOW (SCFM)	307	294	250
SVE INLET TEMP (F)	105	91.4	93.7
DILUTION AIR FLOW (SCFM)	100	102	90
DILUTION AIR TEMP (F)	82	73	68
DILUTION AIR PRESS (INCH WC)	0	0	0
COMBINED INLET AIR FLOW (SCFM)	407	396	340
COMBINED INLET AIR TEMP (F)	95	84	84
COMBINED INLET AIR PRESS (INCH WC)	-1	-1	-1
OUTLET GAS FLOW (SCFM)	455	466	472
OUTLET GAS TEMP (F)	90	87	80
OUTLET GAS PRESS (INCH WC)	-3	-3.5	-3.5
ADSORBER PRESS TOP (kPa)	-4.2	-4.25	-4.3
ADSORBER PRESS MID (kPa)	-2.1	-2.2	-2.1
ADSORBER PRESS BOTTTOM (kPa)	-0.3	-0.25	-0.5
DESORBER PRESS MID (kPa)	-0.44	-0.52	-0.5
DESORBER PRESS BOT (kPa)	-0.26	-0.23	-0.36
CONDENSER TEMP (F)	92	92	96
CHILLED WATER TEMP (F)	37	37.6	39.3
DILUTION AIR TO PDUs (SCFM)	5	4.8	5.2
TOTAL FLOW TO PDUs	6	6	7
FEED GAS TEMP TO PDUs (F)	123.9	131.8	124.8
FEED GAS PRESS TO PDUs (INCH WC)	-12	-10	na
PDU COOLING WATER INLET TEMP (F)	118	120	124
PDU #1 COOLING WATER OUTLET TEMP (F)	108	108	108
PDU #2 COOLING WATER OUTLET TEMP (F)	116	104	94
PDU #1 COOLING WATER FLOW (GPM)	2.4	2.4	0.5
PDU #2 COOLING WATER FLOW (GPM)	375	0.75	2.8
PDU #1 PRESS DROP MID TO OUT (INCH WC)	2	6	0.3
PDU #2 PRESS DROP MID TO OUT (INCH WC)	4	5.5	0.5
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)	4	-12.8	1.3
SCRUBBER OUTLET PRESS (INCH WC)	-12.9	-10	-11
COOLING WATER TANK TEMP (F)	114.5	111.6	118.9
SCRUBBER LIQUID FLOW (GPM)	0.68	1.24	1.17
SCRUBBER pH	13.28	12.57	9.11
OHM SVE RETURN HEADER PRESS (INCH WC)	-34	-34	-34
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)	-13	-13.5	-13
BOOSTER BLOWER SUCTION PRESS (INCH WC)	-32	-32	-32
PDU #1 TEMP (F)	198.1	208.5	196.5
PDU #2 TEMP (F)	152	151.9	147
DESORBER TEMP MID (F)	299.5	296.4	295.4
DESORBER TEMP BOTTOM (F)	234.7	236.6	233.4
BOILER PRESS (PSIG)	50	55	55
SOLVENT STORAGE TANK LEVEL (INCH)	20		
INLET GAS FID READING (PPM)	1100	1000	1000
OUTLET GAS FID READING (PPM)	122	104	94
LEL METER (%)	4	7	5
WATT METER (kW)	751	793	855
HOUR METER	1015.7	1033.4	1058.6
AMBIENT CONDITIONS (TEMP/HUMIDITY)	65 pc	60	60 raining
OPERATOR COMMENTS:	0.23 gph water usage. M.Gray Transferred 2" solvent to storage drum.	J.Ferrell 0.46 gph water usage.	J.Ferrell .36 gph water usage.

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

DATA	Date:1/30/98 Steady-State Tests	Date:1/30/98 Steady-State Tests	Date:1/30/98 Steady-State Tests
SVE INLET FLOW (SCFM)	246	250	250
SVE INLET TEMP (F)	104	96.4	91.9
DILUTION AIR FLOW (SCFM)	88	89	89
DILUTION AIR TEMP (F)	80	75	74
DILUTION AIR PRESS (INCH WC)	0	0	0
COMBINED INLET AIR FLOW (SCFM)	334	339	339
COMBINED INLET AIR TEMP (F)	95	88	84
COMBINED INLET AIR PRESS (INCH WC)	-1	-1	-1
OUTLET GAS FLOW (SCFM)	446	447	466
OUTLET GAS TEMP (F)	101	88	87
OUTLET GAS PRESS (INCH WC)	-3.5	3.5	-3
ADSORBER PRESS TOP (kPa)	-4.2	-4.3	-4.2
ADSORBER PRESS MID (kPa)	-2.1	-2.1	-2.1
ADSORBER PRESS BOTTTOM (kPa)	-0.5	-0.25	-0.23
DESORBER PRESS MID (kPa)	-0.5	-0.55	-0.5
DESORBER PRESS BOT (kPa)	-0.24	-0.25	-0.23
CONDENSER TEMP (F)	94	92	92
CHILLED WATER TEMP (F)	34.5	36.2	34.6
DILUTION AIR TO PDUs (SCFM)	5	5	4.7
TOTAL FLOW TO PDUs	6	6	6
FEED GAS TEMP TO PDUs (F)	137.7	124.9	126.2
FEED GAS PRESS TO PDUs (INCH WC)	-11	-11.8	-10.7
PDU COOLING WATER INLET TEMP (F)	120	120	122
PDU #1 COOLING WATER OUTLET TEMP (F)	108	104	102
PDU #2 COOLING WATER OUTLET TEMP (F)	98	98	90
PDU #1 COOLING WATER FLOW (GPM)	2.5	2.5	2.5
PDU #2 COOLING WATER FLOW (GPM)	0.75	0.75	0.75
PDU #1 PRESS DROP MID TO OUT (INCH WC)	0.3	0.4	0.2
PDU #2 PRESS DROP MID TO OUT (INCH WC)	0.5	0.2	0.6
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)	0.9	0.9	1
SCRUBBER OUTLET PRESS (INCH WC)	-11	-11	-10
COOLING WATER TANK TEMP (F)	112.6	13	115.1
SCRUBBER LIQUID FLOW (GPM)	1.06	0.94	0.98
SCRUBBER pH	12.69	12.45	121.8
OHM SVE RETURN HEADER PRESS (INCH WC)	-36	-42	-38
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)	-13	-13	-13
BOOSTER BLOWER SUCTION PRESS (INCH WC)	-33	-39	-33
PDU #1 TEMP (F)	196.2	104.2	195.2
PDU #2 TEMP (F)	156.2	147.4	146.6
DESORBER TEMP MID (F)	292.3	281.1	286.1
DESORBER TEMP BOTTOM (F)	236.4	233.1	234.3
BOILER PRESS (PSIG)	50	50	50
SOLVENT STORAGE TANK LEVEL (INCH)	23	23.75	24
INLET GAS FID READING (PPM)	1100	1183	1140
OUTLET GAS FID READING (PPM)	178	57	43
LEL METER (%)	6		
WATT METER (kW)	915	936	949
HOUR METER	1081.2	1089.8	1095.2
AMBIENT CONDITIONS (TEMP/HUMIDITY)	55 sunny	60 dusk	52 clear night
OPERATOR COMMENTS:	Start sampling. J.Ferrell		Finish sampling. 0.3 gph water usage.

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

DATA	Date:1/31/98 Steady-State Tests	Date:2/1/98 Steady-State Tests	Date:2/2/98 Steady-State Tests
SVE INLET FLOW (SCFM)	245	290	243
SVE INLET TEMP (F)	98.1	102	107
DILUTION AIR FLOW (SCFM)	95	77	75
DILUTION AIR TEMP (F)	78	90	82
DILUTION AIR PRESS (INCH WC)	0	0	0
COMBINED INLET AIR FLOW (SCFM)	340	367	318
COMBINED INLET AIR TEMP (F)	88	95	-1.5
COMBINED INLET AIR PRESS (INCH WC)	-1	-1.2	96
OUTLET GAS FLOW (SCFM)	447	461	441
OUTLET GAS TEMP (F)	88	93	95
OUTLET GAS PRESS (INCH WC)	-3.5	-3.2	-4
ADSORBER PRESS TOP (kPa)	-4.3	-4.25	-4.3
ADSORBER PRESS MID (kPa)	-2.1	-2.1	-2.2
ADSORBER PRESS BOTTTOM (kPa)	-0.25	-0.26	-0.35
DESORBER PRESS MID (kPa)	-0.5	-0.52	-0.54
DESORBER PRESS BOT (kPa)	-0.25	-0.25	-0.3
CONDENSER TEMP (F)	94	94	96
CHILLED WATER TEMP (F)	41.5	37.6	36.3
DILUTION AIR TO PDUs (SCFM)	4.75	5.25	5.25
TOTAL FLOW TO PDUs	6	7	6.5
FEED GAS TEMP TO PDUs (F)	126	129.3	132.4
FEED GAS PRESS TO PDUs (INCH WC)	-92	-10.6	-120
PDU COOLING WATER INLET TEMP (F)	120	120	123
PDU #1 COOLING WATER OUTLET TEMP (F)	106	110	110
PDU #2 COOLING WATER OUTLET TEMP (F)	108	106	120
PDU #1 COOLING WATER FLOW (GPM)	3.5	4	4.5
PDU #2 COOLING WATER FLOW (GPM)	0.5	1.5	3.75
PDU #1 PRESS DROP MID TO OUT (INCH WC)	6.5	4.5	1
PDU #2 PRESS DROP MID TO OUT (INCH WC)	6.6	4.3	1.8
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)	0.9	3.1	1.2
SCRUBBER OUTLET PRESS (INCH WC)	-11	-11	-11
COOLING WATER TANK TEMP (F)	115.9	117.2	117.3
SCRUBBER LIQUID FLOW (GPM)	0.91	0.97	0.75
SCRUBBER pH	10.3	9.7	12.95
OHM SVE RETURN HEADER PRESS (INCH WC)	na	na	-30
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)	-13	-12.5	-13
BOOSTER BLOWER SUCTION PRESS (INCH WC)	-35	-33	-35
PDU #1 TEMP (F)	206.8	205.1	196.9
PDU #2 TEMP (F)	147.9	150	150.6
DESORBER TEMP MID (F)	282	285.6	284.8
DESORBER TEMP BOTTOM (F)	231.8	238.7	233.3
BOILER PRESS (PSIG)	52	50	50
SOLVENT STORAGE TANK LEVEL (INCH)	25.5	27	28
INLET GAS FID READING (PPM)	1300	1220	1100
OUTLET GAS FID READING (PPM)	58	62	69
LEL METER (%)	4	4	4
WATT METER (kW)	992	1051	1105
HOUR METER	1112.1	1135	1157.4
AMBIENT CONDITIONS (TEMP/HUMIDITY)	55 finished raining	65 sunny	68.7-74.3 sunny
OPERATOR COMMENTS:	0.31 gph water usage. J.Ferrell	0.47 gph water usage. J.Ferrell	0.58 gph water usage. J.Ferrell

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

DATA	Date: 2/4/98 Steady-State Tests	Date: 2/4/98 Steady-State Tests	Date: 2/4/98 Steady-State Tests
SVE INLET FLOW (SCFM)	280	281	283
SVE INLET TEMP (F)	96.8	95.6	92.5
DILUTION AIR FLOW (SCFM)	55	59.5	60
DILUTION AIR TEMP (F)	74	74	70
DILUTION AIR PRESS (INCH WC)	-	-	-
COMBINED INLET AIR FLOW (SCFM)	326	317	319
COMBINED INLET AIR TEMP (F)	87	87	83
COMBINED INLET AIR PRESS (INCH WC)	-1	-1	-1
OUTLET GAS FLOW (SCFM)	438	430	439
OUTLET GAS TEMP (F)	87	86	86
OUTLET GAS PRESS (INCH WC)	-3	-3	-3
ADSORBER PRESS TOP (kPa)	-4.2	-4.3	-4.2
ADSORBER PRESS MID (kPa)	-2	-2	-2.2
ADSORBER PRESS BOTTTOM (kPa)	-0.2	-0.25	-0.25
DESORBER PRESS MID (kPa)	-0.6	-0.54	-0.6
DESORBER PRESS BOT (kPa)	-0.37	-0.28	-0.32
CONDENSER TEMP (F)	101	101	100
CHILLED WATER TEMP (F)	35.2	35.1	37.7
DILUTION AIR TO PDUs (SCFM)	4.5	4.75	4.375
TOTAL FLOW TO PDUs	6	6	5.875
FEED GAS TEMP TO PDUs (F)	127.5	126.4	
FEED GAS PRESS TO PDUs (INCH WC)	-10.2	-8.8	-8
PDU COOLING WATER INLET TEMP (F)	126	126	120
PDU #1 COOLING WATER OUTLET TEMP (F)	107	106	106
PDU #2 COOLING WATER OUTLET TEMP (F)	124	123	118
PDU #1 COOLING WATER FLOW (GPM)	3	3	3
PDU #2 COOLING WATER FLOW (GPM)	2.2	2.2	2.2
PDU #1 PRESS DROP MID TO OUT (INCH WC)	4.6	3.4	4.2
PDU #2 PRESS DROP MID TO OUT (INCH WC)	2.3	1.8	2.7
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)	13.3	12.5	12.8
SCRUBBER OUTLET PRESS (INCH WC)	-10.5	-10.5	-10.5
COOLING WATER TANK TEMP (F)	110.5	119.8	117.7
SCRUBBER LIQUID FLOW (GPM)	0.73	0.78	0.73
SCRUBBER pH	10.78	10.49	10.26
OHM SVE RETURN HEADER PRESS (INCH WC)	-32	-32	-32
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)	-13	-13	-13
BOOSTER BLOWER SUCTION PRESS (INCH WC)	-40	-40	-40
PDU #1 TEMP (F)	206	202.5	205.2
PDU #2 TEMP (F)	149	147.3	143.7
DESORBER TEMP MID (F)	288.7	293.5	293
DESORBER TEMP BOTTOM (F)	229.7	238.8	241.4
BOILER PRESS (PSIG)	60	60	58
SOLVENT STORAGE TANK LEVEL (INCH)	29.75	28	28.25
INLET GAS FID READING (PPM)	1100	1150	1020
OUTLET GAS FID READING (PPM)	84	36	26
LEL METER (%)	6	30	5
WATT METER (kW)	1201	1208	1218
HOUR METER	1191.7	1194.9	1199.4
AMBIENT CONDITIONS (TEMP/HUMIDITY)	63.7 pc	62.6 pc	54.7 pc
OPERATOR COMMENTS:	Start sampling. M.Gray		Finish sampling. 0.65 gph water usage. M.Gray Transferred 2" of solvent to storage drum.

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

	Date: 2/5/98	Date: 2/5/98	Date: 2/5/98
DATA	Steady-State Tests	Steady-State Tests	Steady-State Tests
SVE INLET FLOW (SCFM)	247	289	250
SVE INLET TEMP (F)	97.1	96.5	90.9
DILUTION AIR FLOW (SCFM)	64	51	83
DILUTION AIR TEMP (F)	74	76	70
DILUTION AIR PRESS (INCH WC)	0 -	-	
COMBINED INLET AIR FLOW (SCFM)	311	325	333
COMBINED INLET AIR TEMP (F)	88	89	83
COMBINED INLET AIR PRESS (INCH WC)	-10	-1	-1
OUTLET GAS FLOW (SCFM)	425	422	431
OUTLET GAS TEMP (F)	92	94	85
OUTLET GAS PRESS (INCH WC)	-4.5	-3	-2.5
ADSORBER PRESS TOP (kPa)	-4.2	-4.2	-4.2
ADSORBER PRESS MID (kPa)	-2.2	-2.1	-2.05
ADSORBER PRESS BOTTTOM (kPa)	-0.4	-0.15	-0.15
DESORBER PRESS MID (kPa)	-0.5	-0.52	-0.54
DESORBER PRESS BOT (kPa)	-0.25	-0.3	-0.32
CONDENSER TEMP (F)	100.2	110	103
CHILLED WATER TEMP (F)	41.5	41.5	39
DILUTION AIR TO PDUs (SCFM)	5.5	4.75	4.25
TOTAL FLOW TO PDUs	7.5	6	6
FEED GAS TEMP TO PDUs (F)	67.2	74.3	60.3
FEED GAS PRESS TO PDUs (INCH WC)	-12.2	-11.3	-9.9
PDU COOLING WATER INLET TEMP (F)	118	125	123
PDU #1 COOLING WATER OUTLET TEMP (F)	104	104	1023
PDU #2 COOLING WATER OUTLET TEMP (F)	116	118	118
PDU #1 COOLING WATER FLOW (GPM)	3	3	3
PDU #2 COOLING WATER FLOW (GPM)	2.2	2.2	2.2
PDU #1 PRESS DROP MID TO OUT (INCH WC)	-13.3	1.8	2
PDU #2 PRESS DROP MID TO OUT (INCH WC)	-14.1	1	3.6
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)	1.8	2.5	2.5
SCRUBBER OUTLET PRESS (INCH WC)	-9.5	-10	-10
COOLING WATER TANK TEMP (F)	115.3	114.7	117.3
SCRUBBER LIQUID FLOW (GPM)	0.73	1.18	3.8
SCRUBBER pH	9.97	9.65	9.57
OHM SVE RETURN HEADER PRESS (INCH WC)	-	-	-30
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)	-13	-13	-13
BOOSTER BLOWER SUCTION PRESS (INCH WC)	-39	-36	-34
PDU #1 TEMP (F)	206.3	194.1	204
PDU #2 TEMP (F)	148.2	146.4	143
DESORBER TEMP MID (F)	293.1	292	288
DESORBER TEMP BOTTOM (F)	241.1	240.7	241
BOILER PRESS (PSIG)	58	60	58
SOLVENT STORAGE TANK LEVEL (INCH)	29	28	28.125
INLET GAS FID READING (PPM)	1050	1050	960
OUTLET GAS FID READING (PPM)	33	31	14
LEL METER (%)	5		
WATT METER (kW)	1234	1262	1272
HOUR METER	1207.2	1218	1221.8
AMBIENT CONDITIONS (TEMP/HUMIDITY)	56.8 pc	59.2 pc	55.4 clear
OPERATOR COMMENTS:	Start sampling J.Ferrell		Finish Sampling M.Gray Transferred 2" of solvent to storage drum. 0.48 gph water usage.

PROCESS TECHNOLOGIES INCORPORATED
NAS NORTH ISLAND FIELD DATA SHEET

DATA	Date: 2/6/98 Steady-State Tests	Date: 2/6/98 Steady-State Tests
SVE INLET FLOW (SCFM)	251	250
SVE INLET TEMP (F)	88.9	91.9
DILUTION AIR FLOW (SCFM)	72	71
DILUTION AIR TEMP (F)	69	65
DILUTION AIR PRESS (INCH WC)	0	0
COMBINED INLET AIR FLOW (SCFM)	323	321
COMBINED INLET AIR TEMP (F)	80	81
COMBINED INLET AIR PRESS (INCH WC)	-1	-1
OUTLET GAS FLOW (SCFM)	454	452
OUTLET GAS TEMP (F)	80	82
OUTLET GAS PRESS (INCH WC)	-3	-3.5
ADSORBER PRESS TOP (kPa)	-4.3	-4.3
ADSORBER PRESS MID (kPa)	-2.05	-2.1
ADSORBER PRESS BOTTTOM (kPa)	0.2	-0.2
DESORBER PRESS MID (kPa)	-0.58	-0.52
DESORBER PRESS BOT (kPa)	-0.26	-0.28
CONDENSER TEMP (F)	101	104
CHILLED WATER TEMP (F)	38.5	39
DILUTION AIR TO PDUs (SCFM)	4.7	5
TOTAL FLOW TO PDUs	6	6
FEED GAS TEMP TO PDUs (F)	119.4	122.4
FEED GAS PRESS TO PDUs (INCH WC)	-10.6	-11.3
PDU COOLING WATER INLET TEMP (F)	116	118
PDU #1 COOLING WATER OUTLET TEMP (F)	102	104
PDU #2 COOLING WATER OUTLET TEMP (F)	1169	114
PDU #1 COOLING WATER FLOW (GPM)	3	3
PDU #2 COOLING WATER FLOW (GPM)	2.2	2.2
PDU #1 PRESS DROP MID TO OUT (INCH WC)	0.4	1.3
PDU #2 PRESS DROP MID TO OUT (INCH WC)	1.8	1.5
SCRUBBER PRESS DROP INLET TO FAN (INCH WC)	2.8	2.8
SCRUBBER OUTLET PRESS (INCH WC)	-11	-11
COOLING WATER TANK TEMP (F)	117.7	114.7
SCRUBBER LIQUID FLOW (GPM)	3.5	3.4
SCRUBBER pH	9.53	9.52
OHM SVE RETURN HEADER PRESS (INCH WC)	-	-
CONCENTRATOR OUTLET FILTER PRESS (INCH WC)	-13	-13
BOOSTER BLOWER SUCTION PRESS (INCH WC)	-35	-34
PDU #1 TEMP (F)	203.9	204.7
PDU #2 TEMP (F)	142.5	143.1
DESORBER TEMP MID (F)	286.2	285.7
DESORBER TEMP BOTTOM (F)	238.4	237.1
BOILER PRESS (PSIG)	58	56
SOLVENT STORAGE TANK LEVEL (INCH)	28.5	28.75
INLET GAS FID READING (PPM)	919	1100
OUTLET GAS FID READING (PPM)	25	37
LEL METER (%)	5	5
WATT METER (kW)	1282	1291
HOUR METER	1225.5	1229
AMBIENT CONDITIONS (TEMP/HUMIDITY)	54.0 cool damp	57.4 pc
OPERATOR COMMENTS:	J.Ferrell	M.Gray 0.51 gph water usage. <u>Final Readings:</u> water meter - 173.6 hour meter - 1235 kwh meter - 1309

APPENDIX B
SUMMARY OF PARAMETRIC TESTS
FID, TO-14 AND NMOC RESULTS

Contents:

PTI System DRE (FID) Results
PTI System DRE (Method TO-14) Results
PTI System DRE (NMOC) Results
PDU System DRE (Method TO-14) Results
PDU System DRE (NMOC) Results

PTI System DRE (FID) Results Presented by Date
Parametric Tests

Date	Test Configuration	Inlet Concentration (ppmc)	Outlet Concentration (ppmc)	DRE (%)
10/24/97	1-2	279	188	32.62
10/25/97	1-3	309	86	72.17
10/26/97	1-4	366	127	65.30
10/27/97	1-5	1,367	513	62.47
11/1/97	1-6	1,453	463	68.13
Average		755	275	**60.14**
11/6/97	1-4a	928	55	94.07
11/17/97	1-5a	1,009	112	88.90
11/18/97	1-6a	1,022	265	74.07
Average		986	144	**85.68**
11/20/97	2-6	966	582	39.75
12/19/97	2-5	337	115	65.88
1/7/98	2-3	1,427	414	70.99
1/8/98	2-4	1,860	551	70.38
1/8/98	2-2	1,110	433	60.99
Average		1,140	419	**61.60**
1/7/98	3	1,443	480	66.74
Average		1,443	471	**64.92**

PTI DRE Method TO-14 Results Presented by Sample
Parametric Tests

			Inlet			Outlet			
Test Configuration	Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1-2	10/24/97	Dichlorodifluoromethane	ND	720		ND	770		
1-2	10/24/97	Chloromethane	ND	1400		ND	1500		
1-2	10/24/97	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	720		ND	770		
1-2	10/24/97	Vinyl chloride	1600	720	0.0070	1400	770	0.0062	11.07
1-2	10/24/97	Bromomethane	ND	720		ND	770		
1-2	10/24/97	Chloroethane	ND	1400		ND	1500		
1-2	10/24/97	Trichlorofluoromethane	ND	720		ND	770		
1-2	10/24/97	1,1-Dichloroethene	ND	720		ND	770		
1-2	10/24/97	Carbon disulfide	ND	3600		ND	3800		
1-2	10/24/97	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	720		ND	770		
1-2	10/24/97	Acetone	ND	3600		ND	3800		
1-2	10/24/97	Methylene chloride	ND	720		ND	770		
1-2	10/24/97	trans-1,2-Dichloroethene	ND	720		1500	770	0.0103	
1-2	10/24/97	1,1-Dichloroethane	ND	720		ND	770		
1-2	10/24/97	Vinyl acetate	ND	3600		ND	3800		
1-2	10/24/97	cis-1,2-Dichloroethene	49000	720	0.3316	52000	770	0.3576	-7.86
1-2	10/24/97	2-Butanone	ND	3600		ND	3800		
1-2	10/24/97	Chloroform	ND	720		ND	770		
1-2	10/24/97	1,1,1-Trichloroethane	ND	720		ND	770		
1-2	10/24/97	Carbon tetrachloride	ND	720		ND	770		
1-2	10/24/97	Benzene	ND	720		ND	770		
1-2	10/24/97	1,2-Dichloroethane	ND	720		ND	770		
1-2	10/24/97	Trichloroethene	2700	720	0.0248	2500	770	0.0233	5.89
1-2	10/24/97	1,2-Dichloropropane	ND	720		ND	770		
1-2	10/24/97	Bromodichloromethane	ND	720		ND	770		
1-2	10/24/97	cis-1,3-Dichloropropene	ND	720		ND	770		
1-2	10/24/97	4-Methyl-2-pentanone	ND	3600		ND	3800		
1-2	10/24/97	Toluene	5600	720	0.0360	2600	770	0.0170	52.81
1-2	10/24/97	trans-1,3-Dichloropropene	ND	720		ND	770		
1-2	10/24/97	1,1,2-Trichloroethane	ND	720		ND	770		
1-2	10/24/97	Tetrachloroethene	5400	720	0.0625	2400	770	0.0282	54.83
1-2	10/24/97	2-Hexanone	ND	11000		ND	11000		
1-2	10/24/97	Dibromochloromethane	ND	720		ND	770		
1-2	10/24/97	1,2-Dibromoethane (EDB)	ND	720		ND	770		
1-2	10/24/97	Chlorobenzene	ND	720		ND	770		
1-2	10/24/97	Ethylbenzene	ND	720		ND	770		
1-2	10/24/97	Xylenes (total)	ND	720		ND	770		
1-2	10/24/97	Styrene	ND	720		ND	770		
1-2	10/24/97	Bromoform	ND	720		ND	770		

PTI DRE Method TO-14 Results Presented by Sample
Parametric Tests

			Inlet			Outlet			
Test Configuration	Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1-2	10/24/97	1,1,2,2-Tetrachloroethane	ND	720		ND	770		
1-2	10/24/97	Benzyl chloride	ND	3600		ND	3800		
1-2	10/24/97	4-Ethyltoluene	ND	720		ND	770		
1-2	10/24/97	1,3,5-Trimethylbenzene	ND	720		ND	770		
1-2	10/24/97	1,2,4-Trimethylbenzene	ND	720		ND	770		
1-2	10/24/97	1,3-Dichlorobenzene	ND	720		ND	770		
1-2	10/24/97	1,4-Dichlorobenzene	ND	720		ND	770		
1-2	10/24/97	1,2-Dichlorobenzene	ND	720		ND	770		
1-2	10/24/97	1,2,4-Trichlorobenzene	ND	7200		ND	7700		
1-2	10/24/97	Hexachlorobutadiene	ND	1400		ND	1500		
		Total	**64,300**		**0.4617**	**62,400**		**0.442644**	**4.14**
1-3	10/25/97	Dichlorodifluoromethane	ND	1100		ND	550		
1-3	10/25/97	Chloromethane	ND	2200		ND	1100		
1-3	10/25/97	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	1100		ND	550		
1-3	10/25/97	Vinyl chloride	1600	1100	0.0078	1800	550	0.0087	-12.50
1-3	10/25/97	Bromomethane	ND	1100		ND	550		
1-3	10/25/97	Chloroethane	ND	2200		ND	1100		
1-3	10/25/97	Trichlorofluoromethane	ND	1100		ND	550		
1-3	10/25/97	1,1-Dichloroethene	ND	1100		ND	550		
1-3	10/25/97	Carbon disulfide	ND	5400		ND	2700		
1-3	10/25/97	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	1100		ND	550		
1-3	10/25/97	Acetone	ND	5400		ND	2700		
1-3	10/25/97	Methylene chloride	ND	1100		ND	550		
1-3	10/25/97	trans-1,2-Dichloroethene	ND	1100		970	550	0.0073	
1-3	10/25/97	1,1-Dichloroethane	ND	1100		ND	550		
1-3	10/25/97	Vinyl acetate	ND	5400		ND	2700		
1-3	10/25/97	cis-1,2-Dichloroethene	87000	1100	0.6562	35000	550	0.2640	59.77
1-3	10/25/97	2-Butanone	ND	5400		ND	2700		
1-3	10/25/97	Chloroform	ND	1100		ND	550		
1-3	10/25/97	1,1,1-Trichloroethane	ND	1100		ND	550		
1-3	10/25/97	Carbon tetrachloride	ND	1100		ND	550		
1-3	10/25/97	Benzene	ND	1100		ND	550		
1-3	10/25/97	1,2-Dichloroethane	ND	1100		ND	550		
1-3	10/25/97	Trichloroethene	4700	1100	0.0480	2100	550	0.0215	55.32
1-3	10/25/97	1,2-Dichloropropane	ND	1100		ND	550		
1-3	10/25/97	Bromodichloromethane	ND	1100		ND	550		
1-3	10/25/97	cis-1,3-Dichloropropene	ND	1100		ND	550		
1-3	10/25/97	4-Methyl-2-pentanone	ND	5400		ND	2700		

PTI DRE Method TO-14 Results Presented by Sample
Parametric Tests

			Inlet			Outlet			
Test Configuration	Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1-3	10/25/97	Toluene	11000	1100	0.0788	3100	550	0.0222	71.82
1-3	10/25/97	trans-1,3-Dichloropropene	ND	1100		ND	550		
1-3	10/25/97	1,1,2-Trichloroethane	ND	1100		ND	550		
1-3	10/25/97	Tetrachloroethene	9300	1100	0.1199	3200	550	0.0413	65.59
1-3	10/25/97	2-Hexanone	ND	16000		ND	8200		
1-3	10/25/97	Dibromochloromethane	ND	1100		ND	550		
1-3	10/25/97	1,2-Dibromoethane (EDB)	ND	1100		ND	550		
1-3	10/25/97	Chlorobenzene	ND	1100		ND	550		
1-3	10/25/97	Ethylbenzene	ND	1100		ND	550		
1-3	10/25/97	Xylenes (total)	ND	1100		ND	550		
1-3	10/25/97	Styrene	ND	1100		ND	550		
1-3	10/25/97	Bromoform	ND	1100		ND	550		
1-3	10/25/97	1,1,2,2-Tetrachloroethane	ND	1100		ND	550		
1-3	10/25/97	Benzyl chloride	ND	5400		ND	2700		
1-3	10/25/97	4-Ethyltoluene	ND	1100		ND	550		
1-3	10/25/97	1,3,5-Trimethylbenzene	ND	1100		ND	550		
1-3	10/25/97	1,2,4-Trimethylbenzene	ND	1100		ND	550		
1-3	10/25/97	1,3-Dichlorobenzene	ND	1100		ND	550		
1-3	10/25/97	1,4-Dichlorobenzene	ND	1100		ND	550		
1-3	10/25/97	1,2-Dichlorobenzene	ND	1100		ND	550		
1-3	10/25/97	1,2,4-Trichlorobenzene	ND	11000		ND	5500		
1-3	10/25/97	Hexachlorobutadiene	ND	2200		ND	1100		
		Total	**113,600**		**0.9106**	**46,170**		**0.3650**	**59.92**
1-4	10/26/97	Dichlorodifluoromethane	ND	1100		ND	750		
1-4	10/26/97	Chloromethane	ND	2200		ND	1500		
1-4	10/26/97	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	1100		ND	750		
1-4	10/26/97	Vinyl chloride	2100	1100	0.0096	1500	750	0.0066	30.61
1-4	10/26/97	Bromomethane	ND	1100		ND	750		
1-4	10/26/97	Chloroethane	ND	2200		ND	1500		
1-4	10/26/97	Trichlorofluoromethane	ND	1100		ND	750		
1-4	10/26/97	1,1-Dichloroethene	ND	1100		ND	750		
1-4	10/26/97	Carbon disulfide	ND	5500		ND	3700		
1-4	10/26/97	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	1100		ND	750		
1-4	10/26/97	Acetone	ND	5500		ND	3700		
1-4	10/26/97	Methylene chloride	ND	1100		ND	750		
1-4	10/26/97	trans-1,2-Dichloroethene	ND	1100		ND	750		
1-4	10/26/97	1,1-Dichloroethane	ND	1100		ND	750		
1-4	10/26/97	Vinyl acetate	ND	5500		ND	3700		

PTI DRE Method TO-14 Results Presented by Sample
Parametric Tests

			Inlet			Outlet			
Test Configuration	Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1-4	10/26/97	cis-1,2-Dichloroethene	91000	1100	0.6428	48000	750	0.3294	48.76
1-4	10/26/97	2-Butanone	ND	5500		ND	3700		
1-4	10/26/97	Chloroform	ND	1100		ND	750		
1-4	10/26/97	1,1,1-Trichloroethane	ND	1100		ND	750		
1-4	10/26/97	Carbon tetrachloride	ND	1100		ND	750		
1-4	10/26/97	Benzene	ND	1100		ND	750		
1-4	10/26/97	1,2-Dichloroethane	ND	1100		ND	750		
1-4	10/26/97	Trichloroethene	5200	1100	0.0498	2500	750	0.0232	53.29
1-4	10/26/97	1,2-Dichloropropane	ND	1100		ND	750		
1-4	10/26/97	Bromodichloromethane	ND	1100		ND	750		
1-4	10/26/97	cis-1,3-Dichloropropene	ND	1100		ND	750		
1-4	10/26/97	4-Methyl-2-pentanone	ND	5500		ND	3700		
1-4	10/26/97	Toluene	13000	1100	0.0872	4800	750	0.0313	64.13
1-4	10/26/97	trans-1,3-Dichloropropene	ND	1100		ND	750		
1-4	10/26/97	1,1,2-Trichloroethane	ND	1100		ND	750		
1-4	10/26/97	Tetrachloroethene	11000	1100	0.1328	4500	750	0.0528	60.26
1-4	10/26/97	2-Hexanone	ND	16000		ND	11000		
1-4	10/26/97	Dibromochloromethane	ND	1100		ND	750		
1-4	10/26/97	1,2-Dibromoethane (EDB)	ND	1100		ND	750		
1-4	10/26/97	Chlorobenzene	ND	1100		ND	750		
1-4	10/26/97	Ethylbenzene	ND	1100		ND	750		
1-4	10/26/97	Xylenes (total)	ND	1100		ND	750		
1-4	10/26/97	Styrene	ND	1100		ND	750		
1-4	10/26/97	Bromoform	ND	1100		ND	750		
1-4	10/26/97	1,1,2,2-Tetrachloroethane	ND	1100		ND	750		
1-4	10/26/97	Benzyl chloride	ND	5500		ND	3700		
1-4	10/26/97	4-Ethyltoluene	ND	1100		ND	750		
1-4	10/26/97	1,3,5-Trimethylbenzene	ND	1100		ND	750		
1-4	10/26/97	1,2,4-Trimethylbenzene	ND	1100		ND	750		
1-4	10/26/97	1,3-Dichlorobenzene	ND	1100		ND	750		
1-4	10/26/97	1,4-Dichlorobenzene	ND	1100		ND	750		
1-4	10/26/97	1,2-Dichlorobenzene	ND	1100		ND	750		
1-4	10/26/97	1,2,4-Trichlorobenzene	ND	11000		ND	7500		
1-4	10/26/97	Hexachlorobutadiene	ND	2200		ND	1500		
		Total	**122,300**		**0.9221**	**61,300**		**0.4433**	**51.92**
1-5	10/27/97	Dichlorodifluoromethane	ND	4400		ND	1600		
1-5	10/27/97	Chloromethane	ND	8800		ND	3100		
1-5	10/27/97	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	4400		ND	1600		

PTI DRE Method TO-14 Results Presented by Sample
Parametric Tests

			Inlet			Outlet			
Test Configuration	Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1-5	10/27/97	Vinyl chloride	ND	4400		ND	1600		
1-5	10/27/97	Bromomethane	ND	4400		ND	1600		
1-5	10/27/97	Chloroethane	ND	8800		ND	3100		
1-5	10/27/97	Trichlorofluoromethane	ND	4400		ND	1600		
1-5	10/27/97	1,1-Dichloroethene	ND	4400		ND	1600		
1-5	10/27/97	Carbon disulfide	ND	22000		ND	7800		
1-5	10/27/97	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	4400		ND	1600		
1-5	10/27/97	Acetone	ND	22000		ND	7800		
1-5	10/27/97	Methylene chloride	ND	4400		ND	1600		
1-5	10/27/97	trans-1,2-Dichloroethene	ND	4400		ND	1600		
1-5	10/27/97	1,1-Dichloroethane	ND	4400		ND	1600		
1-5	10/27/97	Vinyl acetate	ND	22000		ND	7800		
1-5	10/27/97	cis-1,2-Dichloroethene	220000	4400	1.4965	110000	1600	0.7482	50.00
1-5	10/27/97	2-Butanone	ND	22000		ND	7800		
1-5	10/27/97	Chloroform	ND	4400		ND	1600		
1-5	10/27/97	1,1,1-Trichloroethane	ND	4400		ND	1600		
1-5	10/27/97	Carbon tetrachloride	ND	4400		ND	1600		
1-5	10/27/97	Benzene	ND	4400		ND	1600		
1-5	10/27/97	1,2-Dichloroethane	ND	4400		ND	1600		
1-5	10/27/97	Trichloroethene	100000	4400	0.9214	13000	1600	0.1198	87.00
1-5	10/27/97	1,2-Dichloropropane	ND	4400		ND	1600		
1-5	10/27/97	Bromodichloromethane	ND	4400		ND	1600		
1-5	10/27/97	cis-1,3-Dichloropropene	ND	4400		ND	1600		
1-5	10/27/97	4-Methyl-2-pentanone	ND	22000		ND	7800		
1-5	10/27/97	Toluene	6400	4400	0.0413	8200	1600	0.0530	-28.13
1-5	10/27/97	trans-1,3-Dichloropropene	ND	4400		ND	1600		
1-5	10/27/97	1,1,2-Trichloroethane	ND	4400		ND	1600		
1-5	10/27/97	Tetrachloroethene	27000	4400	0.3139	8400	1600	0.0977	68.89
1-5	10/27/97	2-Hexanone	ND	66000		ND	24000		
1-5	10/27/97	Dibromochloromethane	ND	4400		ND	1600		
1-5	10/27/97	1,2-Dibromoethane (EDB)	ND	4400		ND	1600		
1-5	10/27/97	Chlorobenzene	ND	4400		ND	1600		
1-5	10/27/97	Ethylbenzene	ND	4400		ND	1600		
1-5	10/27/97	Xylenes (total)	ND	4400		ND	1600		
1-5	10/27/97	Styrene	ND	4400		ND	1600		
1-5	10/27/97	Bromoform	ND	4400		ND	1600		
1-5	10/27/97	1,1,2,2-Tetrachloroethane	ND	4400		ND	1600		
1-5	10/27/97	Benzyl chloride	ND	22000		ND	7800		
1-5	10/27/97	4-Ethyltoluene	ND	4400		ND	1600		

PTI DRE Method TO-14 Results Presented by Sample
Parametric Tests

			Inlet			Outlet			
Test Configuration	Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1-5	10/27/97	1,3,5-Trimethylbenzene	ND	4400		ND	1600		
1-5	10/27/97	1,2,4-Trimethylbenzene	ND	4400		ND	1600		
1-5	10/27/97	1,3-Dichlorobenzene	ND	4400		ND	1600		
1-5	10/27/97	1,4-Dichlorobenzene	ND	4400		ND	1600		
1-5	10/27/97	1,2-Dichlorobenzene	ND	4400		ND	1600		
1-5	10/27/97	1,2,4-Trichlorobenzene	ND	44000		ND	16000		
1-5	10/27/97	Hexachlorobutadiene	ND	8800		ND	3100		
		Total	353,400		2.7732	139,600		1.0186	63.27
1-6	11/1/97	Dichlorodifluoromethane	ND	2100		ND	490		
1-6	11/1/97	Chloromethane	ND	4200		ND	970		
1-6	11/1/97	1,2-Dichloro-1,1,2,2-^tetrafluoroethan	ND	2100		ND	490		
1-6	11/1/97	Vinyl chloride	ND	2100		ND	490		
1-6	11/1/97	Bromomethane	ND	2100		ND	490		
1-6	11/1/97	Chloroethane	ND	4200		ND	970		
1-6	11/1/97	Trichlorofluoromethane	ND	2100		ND	490		
1-6	11/1/97	1,1-Dichloroethene	ND	2100		ND	490		
1-6	11/1/97	Carbon disulfide	ND	11000		ND	2400		
1-6	11/1/97	1,1,2-Trichloro-1,2,2-^trifluoroethane	ND	2100		ND	490		
1-6	11/1/97	Acetone	ND	11000		ND	2400		
1-6	11/1/97	Methylene chloride	ND	2100		ND	490		
1-6	11/1/97	trans-1,2-Dichloroethene	ND	2100		ND	490		
1-6	11/1/97	1,1-Dichloroethane	ND	2100		ND	490		
1-6	11/1/97	Vinyl acetate	ND	11000		ND	2400		
1-6	11/1/97	cis-1,2-Dichloroethene	120000	2100	0.6706	34000	490	0.1900	71.67
1-6	11/1/97	2-Butanone	ND	11000		ND	2400		
1-6	11/1/97	Chloroform	ND	2100		ND	490		
1-6	11/1/97	1,1,1-Trichloroethane	ND	2100		ND	490		
1-6	11/1/97	Carbon tetrachloride	ND	2100		ND	490		
1-6	11/1/97	Benzene	ND	2100		ND	490		
1-6	11/1/97	1,2-Dichloroethane	ND	2100		ND	490		
1-6	11/1/97	Trichloroethene	65000	2100	0.4921	16000	490	0.1211	75.38
1-6	11/1/97	1,2-Dichloropropane	ND	2100		ND	490		
1-6	11/1/97	Bromodichloromethane	ND	2100		ND	490		
1-6	11/1/97	cis-1,3-Dichloropropene	ND	2100		ND	490		
1-6	11/1/97	4-Methyl-2-pentanone	ND	11000		ND	2400		
1-6	11/1/97	Toluene	9100	2100	0.0483	2700	490	0.0143	70.33
1-6	11/1/97	trans-1,3-Dichloropropene	ND	2100		ND	490		
1-6	11/1/97	1,1,2-Trichloroethane	ND	2100		ND	490		

PTI DRE Method TO-14 Results Presented by Sample
Parametric Tests

Test Configuration	Date	Compound Name	Inlet Concentration (ppbv)	Inlet Reporting Limit (ppbv)	Inlet Mass Rate (lbs/hr)	Outlet Concentration (ppbv)	Outlet Reporting Limit (ppbv)	Outlet Mass Rate (lbs/hr)	DRE (%)
1-6	11/1/97	Tetrachloroethene	25000	2100	0.2388	5400	490	0.0516	78.40
1-6	11/1/97	2-Hexanone	ND	32000		ND	7300		
1-6	11/1/97	Dibromochloromethane	ND	2100		ND	490		
1-6	11/1/97	1,2-Dibromoethane (EDB)	ND	2100		ND	490		
1-6	11/1/97	Chlorobenzene	ND	2100		ND	490		
1-6	11/1/97	Ethylbenzene	ND	2100		ND	490		
1-6	11/1/97	Xylenes (total)	ND	2100		ND	490		
1-6	11/1/97	Styrene	ND	2100		ND	490		
1-6	11/1/97	Bromoform	ND	2100		ND	490		
1-6	11/1/97	1,1,2,2-Tetrachloroethane	ND	2100		ND	490		
1-6	11/1/97	Benzyl chloride	ND	11000		ND	2400		
1-6	11/1/97	4-Ethyltoluene	ND	2100		ND	490		
1-6	11/1/97	1,3,5-Trimethylbenzene	ND	2100		ND	490		
1-6	11/1/97	1,2,4-Trimethylbenzene	ND	2100		ND	490		
1-6	11/1/97	1,3-Dichlorobenzene	ND	2100		ND	490		
1-6	11/1/97	1,4-Dichlorobenzene	ND	2100		ND	490		
1-6	11/1/97	1,2-Dichlorobenzene	ND	2100		ND	490		
1-6	11/1/97	1,2,4-Trichlorobenzene	ND	21000		ND	4900		
1-6	11/1/97	Hexachlorobutadiene	ND	4200		ND	970		
		Total	**219,100**		**1.4498**	**58,100**		**0.3771**	**73.99**
1-4A	11/6/97	Dichlorodifluoromethane	ND	1100		ND	100		
1-4A	11/6/97	Chloromethane	ND	2300		ND	200		
1-4A	11/6/97	1,2-Dichloro-1,1,2,2-^tetrafluoroethan	ND	1100		ND	100		
1-4A	11/6/97	Vinyl chloride	ND	1100		300	100	0.0012	
1-4A	11/6/97	Bromomethane	ND	1100		ND	100		
1-4A	11/6/97	Chloroethane	ND	2300		ND	200		
1-4A	11/6/97	Trichlorofluoromethane	ND	1100		ND	100		
1-4A	11/6/97	1,1-Dichloroethene	ND	1100		ND	100		
1-4A	11/6/97	Carbon disulfide	ND	5700		ND	510		
1-4A	11/6/97	1,1,2-Trichloro-1,2,2-^trifluoroethane	ND	1100		ND	100		
1-4A	11/6/97	Acetone	ND	5700		ND	510		
1-4A	11/6/97	Methylene chloride	ND	1100		120	100	0.0006	
1-4A	11/6/97	trans-1,2-Dichloroethene	ND	1100		ND	100		
1-4A	11/6/97	1,1-Dichloroethane	ND	1100		ND	100		
1-4A	11/6/97	Vinyl acetate	ND	5700		ND	510		
1-4A	11/6/97	cis-1,2-Dichloroethene	66000	1100	0.4028	7500	100	0.0458	88.64
1-4A	11/6/97	2-Butanone	ND	5700		ND	510		
1-4A	11/6/97	Chloroform	ND	1100		270	100	0.0020	

PTI DRE Method TO-14 Results Presented by Sample
Parametric Tests

			Inlet			Outlet			
Test Configuration	Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1-4A	11/6/97	1,1,1-Trichloroethane	ND	1100		ND	100		
1-4A	11/6/97	Carbon tetrachloride	ND	1100		ND	100		
1-4A	11/6/97	Benzene	ND	1100		ND	100		
1-4A	11/6/97	1,2-Dichloroethane	ND	1100		ND	100		
1-4A	11/6/97	Trichloroethene	45000	1100	0.3720	4500	100	0.0372	90.00
1-4A	11/6/97	1,2-Dichloropropane	ND	1100		ND	100		
1-4A	11/6/97	Bromodichloromethane	ND	1100		ND	100		
1-4A	11/6/97	cis-1,3-Dichloropropene	ND	1100		ND	100		
1-4A	11/6/97	4-Methyl-2-pentanone	ND	5700		ND	510		
1-4A	11/6/97	Toluene	5000	1100	0.0290	720	100	0.0042	85.60
1-4A	11/6/97	trans-1,3-Dichloropropene	ND	1100		ND	100		
1-4A	11/6/97	1,1,2-Trichloroethane	ND	1100		ND	100		
1-4A	11/6/97	Tetrachloroethene	16000	1100	0.1669	1700	100	0.0177	89.38
1-4A	11/6/97	2-Hexanone	ND	17000		ND	1500		
1-4A	11/6/97	Dibromochloromethane	ND	1100		ND	100		
1-4A	11/6/97	1,2-Dibromoethane (EDB)	ND	1100		ND	100		
1-4A	11/6/97	Chlorobenzene	ND	1100		ND	100		
1-4A	11/6/97	Ethylbenzene	ND	1100		ND	100		
1-4A	11/6/97	Xylenes (total)	ND	1100		ND	100		
1-4A	11/6/97	Styrene	ND	1100		ND	100		
1-4A	11/6/97	Bromoform	ND	1100		ND	100		
1-4A	11/6/97	1,1,2,2-Tetrachloroethane	ND	1100		ND	100		
1-4A	11/6/97	Benzyl chloride	ND	5700		ND	510		
1-4A	11/6/97	4-Ethyltoluene	ND	1100		ND	100		
1-4A	11/6/97	1,3,5-Trimethylbenzene	ND	1100		ND	100		
1-4A	11/6/97	1,2,4-Trimethylbenzene	ND	1100		ND	100		
1-4A	11/6/97	1,3-Dichlorobenzene	ND	1100		ND	100		
1-4A	11/6/97	1,4-Dichlorobenzene	ND	1100		ND	100		
1-4A	11/6/97	1,2-Dichlorobenzene	ND	1100		ND	100		
1-4A	11/6/97	1,2,4-Trichlorobenzene	ND	11000		ND	1000		
1-4A	11/6/97	Hexachlorobutadiene	ND	2300		ND	200		
		Total	**132,000**		**0.9706**	**15,110**		**0.1087**	**88.80**
1-5A	11/17/97	Dichlorodifluoromethane	ND	2800		ND	130		
1-5A	11/17/97	Chloromethane	ND	5600		ND	260		
1-5A	11/17/97	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	2800		ND	130		
1-5A	11/17/97	Vinyl chloride	ND	2800		560	130	0.0022	
1-5A	11/17/97	Bromomethane	ND	2800		ND	130		
1-5A	11/17/97	Chloroethane	ND	5600		ND	260		

PTI DRE Method TO-14 Results Presented by Sample
Parametric Tests

			Inlet			Outlet			
Test Configuration	Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1-5A	11/17/97	Trichlorofluoromethane	ND	2800		ND	130		
1-5A	11/17/97	1,1-Dichloroethene	ND	2800		ND	130		
1-5A	11/17/97	Carbon disulfide	ND	14000		ND	650		
1-5A	11/17/97	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	2800		ND	130		
1-5A	11/17/97	Acetone	ND	14000		ND	650		
1-5A	11/17/97	Methylene chloride	ND	2800		ND	130		
1-5A	11/17/97	trans-1,2-Dichloroethene	ND	2800		170	130	0.0010	
1-5A	11/17/97	1,1-Dichloroethane	ND	2800		ND	130		
1-5A	11/17/97	Vinyl acetate	ND	14000		ND	650		
1-5A	11/17/97	cis-1,2-Dichloroethene	190000	2800	1.1403	14000	130	0.0842	92.62
1-5A	11/17/97	2-Butanone	ND	14000		ND	650		
1-5A	11/17/97	Chloroform	ND	2800		200	130	0.0015	
1-5A	11/17/97	1,1,1-Trichloroethane	ND	2800		ND	130		
1-5A	11/17/97	Carbon tetrachloride	ND	2800		ND	130		
1-5A	11/17/97	Benzene	ND	2800		ND	130		
1-5A	11/17/97	1,2-Dichloroethane	ND	2800		ND	130		
1-5A	11/17/97	Trichloroethene	74000	2800	0.6016	5800	130	0.0472	92.15
1-5A	11/17/97	1,2-Dichloropropane	ND	2800		ND	130		
1-5A	11/17/97	Bromodichloromethane	ND	2800		ND	130		
1-5A	11/17/97	cis-1,3-Dichloropropene	ND	2800		ND	130		
1-5A	11/17/97	4-Methyl-2-pentanone	ND	14000		ND	650		
1-5A	11/17/97	Toluene	9400	2800	0.0536	630	130	0.0036	93.29
1-5A	11/17/97	trans-1,3-Dichloropropene	ND	2800		ND	130		
1-5A	11/17/97	1,1,2-Trichloroethane	ND	2800		ND	130		
1-5A	11/17/97	Tetrachloroethene	35000	2800	0.3590	1800	130	0.0185	94.85
1-5A	11/17/97	2-Hexanone	ND	42000		ND	1900		
1-5A	11/17/97	Dibromochloromethane	ND	2800		ND	130		
1-5A	11/17/97	1,2-Dibromoethane (EDB)	ND	2800		ND	130		
1-5A	11/17/97	Chlorobenzene	ND	2800		ND	130		
1-5A	11/17/97	Ethylbenzene	ND	2800		ND	130		
1-5A	11/17/97	Xylenes (total)	ND	2800		ND	130		
1-5A	11/17/97	Styrene	ND	2800		ND	130		
1-5A	11/17/97	Bromoform	ND	2800		ND	130		
1-5A	11/17/97	1,1,2,2-Tetrachloroethane	ND	2800		ND	130		
1-5A	11/17/97	Benzyl chloride	ND	14000		ND	650		
1-5A	11/17/97	4-Ethyltoluene	ND	2800		ND	130		
1-5A	11/17/97	1,3,5-Trimethylbenzene	ND	2800		ND	130		
1-5A	11/17/97	1,2,4-Trimethylbenzene	ND	2800		ND	130		
1-5A	11/17/97	1,3-Dichlorobenzene	ND	2800		ND	130		

PTI DRE Method TO-14 Results Presented by Sample
Parametric Tests

Test Configuration	Date	Compound Name	Inlet Concentration (ppbv)	Inlet Reporting Limit (ppbv)	Inlet Mass Rate (lbs/hr)	Outlet Concentration (ppbv)	Outlet Reporting Limit (ppbv)	Outlet Mass Rate (lbs/hr)	DRE (%)
1-5A	11/17/97	1,4-Dichlorobenzene	ND	2800		ND	130		
1-5A	11/17/97	1,2-Dichlorobenzene	ND	2800		ND	130		
1-5A	11/17/97	1,2,4-Trichlorobenzene	ND	28000		ND	1300		
1-5A	11/17/97	Hexachlorobutadiene	ND	5600		ND	260		
		Total	308,400		2.1545	23,160		0.1582	92.66
1-6A	11/18/97	Dichlorodifluoromethane	ND	1500		ND	730		
1-6A	11/18/97	Chloromethane	ND	3100		ND	1500		
1-6A	11/18/97	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	1500		ND	730		
1-6A	11/18/97	Vinyl chloride	ND	1500		ND	730		
1-6A	11/18/97	Bromomethane	ND	1500		ND	730		
1-6A	11/18/97	Chloroethane	ND	3100		ND	1500		
1-6A	11/18/97	Trichlorofluoromethane	ND	1500		ND	730		
1-6A	11/18/97	1,1-Dichloroethene	ND	1500		ND	730		
1-6A	11/18/97	Carbon disulfide	ND	7700		ND	3700		
1-6A	11/18/97	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	1500		ND	730		
1-6A	11/18/97	Acetone	ND	7700		ND	3700		
1-6A	11/18/97	Methylene chloride	ND	1500		ND	730		
1-6A	11/18/97	trans-1,2-Dichloroethene	ND	1500		ND	730		
1-6A	11/18/97	1,1-Dichloroethane	ND	1500		ND	730		
1-6A	11/18/97	Vinyl acetate	ND	7700		ND	3700		
1-6A	11/18/97	cis-1,2-Dichloroethene	170000	1500	1.0228	56000	730	0.3361	67.14
1-6A	11/18/97	2-Butanone	ND	7700		ND	3700		
1-6A	11/18/97	Chloroform	ND	1500		ND	730		
1-6A	11/18/97	1,1,1-Trichloroethane	ND	1500		ND	730		
1-6A	11/18/97	Carbon tetrachloride	ND	1500		ND	730		
1-6A	11/18/97	Benzene	ND	1500		ND	730		
1-6A	11/18/97	1,2-Dichloroethane	ND	1500		ND	730		
1-6A	11/18/97	Trichloroethene	75000	1500	0.6113	20000	730	0.1626	73.40
1-6A	11/18/97	1,2-Dichloropropane	ND	1500		ND	730		
1-6A	11/18/97	Bromodichloromethane	ND	1500		ND	730		
1-6A	11/18/97	cis-1,3-Dichloropropene	ND	1500		ND	730		
1-6A	11/18/97	4-Methyl-2-pentanone	ND	7700		ND	3700		
1-6A	11/18/97	Toluene	10000	1500	0.0571	1400	730	0.0080	86.04
1-6A	11/18/97	trans-1,3-Dichloropropene	ND	1500		ND	730		
1-6A	11/18/97	1,1,2-Trichloroethane	ND	1500		ND	730		
1-6A	11/18/97	Tetrachloroethene	38000	1500	0.3908	5000	730	0.0513	86.88
1-6A	11/18/97	2-Hexanone	ND	23000		ND	11000		
1-6A	11/18/97	Dibromochloromethane	ND	1500		ND	730		

PTI DRE Method TO-14 Results Presented by Sample
Parametric Tests

			Inlet			Outlet			
Test Configuration	Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1-6A	11/18/97	1,2-Dibromoethane (EDB)	ND	1500		ND	730		
1-6A	11/18/97	Chlorobenzene	ND	1500		ND	730		
1-6A	11/18/97	Ethylbenzene	ND	1500		ND	730		
1-6A	11/18/97	Xylenes (total)	ND	1500		ND	730		
1-6A	11/18/97	Styrene	ND	1500		ND	730		
1-6A	11/18/97	Bromoform	ND	1500		ND	730		
1-6A	11/18/97	1,1,2,2-Tetrachloroethane	ND	1500		ND	730		
1-6A	11/18/97	Benzyl chloride	ND	7700		ND	3700		
1-6A	11/18/97	4-Ethyltoluene	ND	1500		ND	730		
1-6A	11/18/97	1,3,5-Trimethylbenzene	ND	1500		ND	730		
1-6A	11/18/97	1,2,4-Trimethylbenzene	ND	1500		ND	730		
1-6A	11/18/97	1,3-Dichlorobenzene	ND	1500		ND	730		
1-6A	11/18/97	1,4-Dichlorobenzene	ND	1500		ND	730		
1-6A	11/18/97	1,2-Dichlorobenzene	ND	1500		ND	730		
1-6A	11/18/97	1,2,4-Trichlorobenzene	ND	15000		ND	7300		
1-6A	11/18/97	Hexachlorobutadiene	ND	3100		ND	1500		
		Total	**293,000**		**2.0821**	**82,400**		**0.5580**	**73.20**
2-2	1/8/98	Dichlorodifluoromethane	ND	2800		ND	1500		
2-2	1/8/98	Chloromethane	ND	5600		ND	2900		
2-2	1/8/98	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	2800		ND	1500		
2-2	1/8/98	Vinyl chloride	ND	2800		ND	1500		
2-2	1/8/98	Bromomethane	ND	2800		ND	1500		
2-2	1/8/98	Chloroethane	ND	5600		ND	2900		
2-2	1/8/98	Trichlorofluoromethane	ND	2800		ND	1500		
2-2	1/8/98	1,1-Dichloroethene	ND	2800		ND	1500		
2-2	1/8/98	Carbon disulfide	ND	14000		ND	7300		
2-2	1/8/98	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	2800		ND	1500		
2-2	1/8/98	Acetone	ND	14000		ND	7300		
2-2	1/8/98	Methylene chloride	ND	2800		ND	1500		
2-2	1/8/98	trans-1,2-Dichloroethene	ND	2800		ND	1500		
2-2	1/8/98	1,1-Dichloroethane	ND	2800		ND	1500		
2-2	1/8/98	Vinyl acetate	ND	14000		ND	7300		
2-2	1/8/98	cis-1,2-Dichloroethene	200000	2800	0.9586	140000	1500	0.8275	13.68
2-2	1/8/98	2-Butanone	ND	14000		ND	7300		
2-2	1/8/98	Chloroform	ND	2800		ND	1500		
2-2	1/8/98	1,1,1-Trichloroethane	ND	2800		ND	1500		
2-2	1/8/98	Carbon tetrachloride	ND	2800		ND	1500		
2-2	1/8/98	Benzene	ND	2800		ND	1500		

PTI DRE Method TO-14 Results Presented by Sample
Parametric Tests

Test Configuration	Date	Compound Name	Inlet Concentration (ppbv)	Inlet Reporting Limit (ppbv)	Inlet Mass Rate (lbs/hr)	Outlet Concentration (ppbv)	Outlet Reporting Limit (ppbv)	Outlet Mass Rate (lbs/hr)	DRE (%)
2-2	1/8/98	1,2-Dichloroethane	ND	2800		ND	1500		
2-2	1/8/98	Trichloroethene	75000	2800	0.4870	35000	1500	0.2803	42.45
2-2	1/8/98	1,2-Dichloropropane	ND	2800		ND	1500		
2-2	1/8/98	Bromodichloromethane	ND	2800		ND	1500		
2-2	1/8/98	cis-1,3-Dichloropropene	ND	2800		ND	1500		
2-2	1/8/98	4-Methyl-2-pentanone	ND	14000		ND	7300		
2-2	1/8/98	Toluene	16000	2800	0.0728	2200	1500	0.0123	83.04
2-2	1/8/98	trans-1,3-Dichloropropene	ND	2800		ND	1500		
2-2	1/8/98	1,1,2-Trichloroethane	ND	2800		ND	1500		
2-2	1/8/98	Tetrachloroethene	42000	2800	0.3441	10000	1500	0.1010	70.64
2-2	1/8/98	2-Hexanone	ND	42000		ND	22000		
2-2	1/8/98	Dibromochloromethane	ND	2800		ND	1500		
2-2	1/8/98	1,2-Dibromoethane (EDB)	ND	2800		ND	1500		
2-2	1/8/98	Chlorobenzene	ND	2800		ND	1500		
2-2	1/8/98	Ethylbenzene	ND	2800		ND	1500		
2-2	1/8/98	Xylenes (total)	ND	2800		ND	1500		
2-2	1/8/98	Styrene	ND	2800		ND	1500		
2-2	1/8/98	Bromoform	ND	2800		ND	1500		
2-2	1/8/98	1,1,2,2-Tetrachloroethane	ND	2800		ND	1500		
2-2	1/8/98	Benzyl chloride	ND	14000		ND	7300		
2-2	1/8/98	4-Ethyltoluene	ND	2800		ND	1500		
2-2	1/8/98	1,3,5-Trimethylbenzene	ND	2800		ND	1500		
2-2	1/8/98	1,2,4-Trimethylbenzene	ND	2800		ND	1500		
2-2	1/8/98	1,3-Dichlorobenzene	ND	2800		ND	1500		
2-2	1/8/98	1,4-Dichlorobenzene	ND	2800		ND	1500		
2-2	1/8/98	1,2-Dichlorobenzene	ND	2800		ND	1500		
2-2	1/8/98	1,2,4-Trichlorobenzene	ND	28000		ND	15000		
2-2	1/8/98	Hexachlorobutadiene	ND	5600		ND	2900		
		Total	**333,000**		**1.8625**	**187,200**		**1.2212**	**34.44**
2-3	1/7/98	Dichlorodifluoromethane	ND	2000		ND	750		
2-3	1/7/98	Chloromethane	ND	4000		ND	1500		
2-3	1/7/98	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	2000		ND	750		
2-3	1/7/98	Vinyl chloride	ND	2000		ND	750		
2-3	1/7/98	Bromomethane	ND	2000		ND	750		
2-3	1/7/98	Chloroethane	ND	4000		ND	1500		
2-3	1/7/98	Trichlorofluoromethane	ND	2000		ND	750		
2-3	1/7/98	1,1-Dichloroethene	ND	2000		ND	750		
2-3	1/7/98	Carbon disulfide	ND	10000		ND	3700		

PTI DRE Method TO-14 Results Presented by Sample
Parametric Tests

			Inlet			Outlet			
Test Configuration	Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
2-3	1/7/98	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	2000		ND	750		
2-3	1/7/98	Acetone	ND	10000		ND	3700		
2-3	1/7/98	Methylene chloride	ND	2000		ND	750		
2-3	1/7/98	trans-1,2-Dichloroethene	ND	2000		ND	750		
2-3	1/7/98	1,1-Dichloroethane	ND	2000		ND	750		
2-3	1/7/98	Vinyl acetate	ND	10000		ND	3700		
2-3	1/7/98	cis-1,2-Dichloroethene	240000	2000	1.4803	55000	750	0.3550	76.02
2-3	1/7/98	2-Butanone	ND	10000		ND	3700		
2-3	1/7/98	Chloroform	ND	2000		ND	750		
2-3	1/7/98	1,1,1-Trichloroethane	ND	2000		ND	750		
2-3	1/7/98	Carbon tetrachloride	ND	2000		ND	750		
2-3	1/7/98	Benzene	ND	2000		ND	750		
2-3	1/7/98	1,2-Dichloroethane	ND	2000		ND	750		
2-3	1/7/98	Trichloroethene	88000	2000	0.7352	16000	750	0.1399	80.97
2-3	1/7/98	1,2-Dichloropropane	ND	2000		ND	750		
2-3	1/7/98	Bromodichloromethane	ND	2000		ND	750		
2-3	1/7/98	cis-1,3-Dichloropropene	ND	2000		ND	750		
2-3	1/7/98	4-Methyl-2-pentanone	ND	10000		ND	3700		
2-3	1/7/98	Toluene	15000	2000	0.0878	800	750	0.0049	94.42
2-3	1/7/98	trans-1,3-Dichloropropene	ND	2000		ND	750		
2-3	1/7/98	1,1,2-Trichloroethane	ND	2000		ND	750		
2-3	1/7/98	Tetrachloroethene	40000	2000	0.4217	4700	750	0.0519	87.70
2-3	1/7/98	2-Hexanone	ND	30000		ND	11000		
2-3	1/7/98	Dibromochloromethane	ND	2000		ND	750		
2-3	1/7/98	1,2-Dibromoethane (EDB)	ND	2000		ND	750		
2-3	1/7/98	Chlorobenzene	ND	2000		ND	750		
2-3	1/7/98	Ethylbenzene	ND	2000		ND	750		
2-3	1/7/98	Xylenes (total)	ND	2000		ND	750		
2-3	1/7/98	Styrene	ND	2000		ND	750		
2-3	1/7/98	Bromoform	ND	2000		ND	750		
2-3	1/7/98	1,1,2,2-Tetrachloroethane	ND	2000		ND	750		
2-3	1/7/98	Benzyl chloride	ND	10000		ND	3700		
2-3	1/7/98	4-Ethyltoluene	ND	2000		ND	750		
2-3	1/7/98	1,3,5-Trimethylbenzene	ND	2000		ND	750		
2-3	1/7/98	1,2,4-Trimethylbenzene	ND	2000		ND	750		
2-3	1/7/98	1,3-Dichlorobenzene	ND	2000		ND	750		
2-3	1/7/98	1,4-Dichlorobenzene	ND	2000		ND	750		
2-3	1/7/98	1,2-Dichlorobenzene	ND	2000		ND	750		
2-3	1/7/98	1,2,4-Trichlorobenzene	ND	20000		ND	7500		

PTI DRE Method TO-14 Results Presented by Sample
Parametric Tests

Test Configuration	Date	Compound Name	Inlet Concentration (ppbv)	Inlet Reporting Limit (ppbv)	Inlet Mass Rate (lbs/hr)	Outlet Concentration (ppbv)	Outlet Reporting Limit (ppbv)	Outlet Mass Rate (lbs/hr)	DRE (%)
2-3	1/7/98	Hexachlorobutadiene	ND	4000		ND	1500		
		Total	**383,000**		**2.7250**	**76,500**		**0.5517**	**79.76**
2-4	1/8/98	Dichlorodifluoromethane	ND	4200		ND	1300		
2-4	1/8/98	Chloromethane	ND	8400		ND	2600		
2-4	1/8/98	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	4200		ND	1300		
2-4	1/8/98	Vinyl chloride	ND	4200		ND	1300		
2-4	1/8/98	Bromomethane	ND	4200		ND	1300		
2-4	1/8/98	Chloroethane	ND	8400		ND	2600		
2-4	1/8/98	Trichlorofluoromethane	ND	4200		ND	1300		
2-4	1/8/98	1,1-Dichloroethene	ND	4200		ND	1300		
2-4	1/8/98	Carbon disulfide	ND	21000		ND	6600		
2-4	1/8/98	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	4200		ND	1300		
2-4	1/8/98	Acetone	ND	21000		ND	6600		
2-4	1/8/98	Methylene chloride	ND	4200		ND	1300		
2-4	1/8/98	trans-1,2-Dichloroethene	ND	4200		ND	1300		
2-4	1/8/98	1,1-Dichloroethane	ND	4200		ND	1300		
2-4	1/8/98	Vinyl acetate	ND	21000		ND	6600		
2-4	1/8/98	cis-1,2-Dichloroethene	310000	4200	1.5421	130000	1300	0.8188	46.90
2-4	1/8/98	2-Butanone	ND	21000		ND	6600		
2-4	1/8/98	Chloroform	ND	4200		ND	1300		
2-4	1/8/98	1,1,1-Trichloroethane	ND	4200		ND	1300		
2-4	1/8/98	Carbon tetrachloride	ND	4200		ND	1300		
2-4	1/8/98	Benzene	ND	4200		ND	1300		
2-4	1/8/98	1,2-Dichloroethane	ND	4200		ND	1300		
2-4	1/8/98	Trichloroethene	110000	4200	0.7412	29000	1300	0.2474	66.62
2-4	1/8/98	1,2-Dichloropropane	ND	4200		ND	1300		
2-4	1/8/98	Bromodichloromethane	ND	4200		ND	1300		
2-4	1/8/98	cis-1,3-Dichloropropene	ND	4200		ND	1300		
2-4	1/8/98	4-Methyl-2-pentanone	ND	21000		ND	6600		
2-4	1/8/98	Toluene	20000	4200	0.0945	1700	1300	0.0102	89.24
2-4	1/8/98	trans-1,3-Dichloropropene	ND	4200		ND	1300		
2-4	1/8/98	1,1,2-Trichloroethane	ND	4200		ND	1300		
2-4	1/8/98	Tetrachloroethene	51000	4200	0.4336	8500	1300	0.0915	78.90
2-4	1/8/98	2-Hexanone	ND	63000		ND	20000		
2-4	1/8/98	Dibromochloromethane	ND	4200		ND	1300		
2-4	1/8/98	1,2-Dibromoethane (EDB)	ND	4200		ND	1300		
2-4	1/8/98	Chlorobenzene	ND	4200		ND	1300		
2-4	1/8/98	Ethylbenzene	ND	4200		ND	1300		

PTI DRE Method TO-14 Results Presented by Sample
Parametric Tests

			Inlet			Outlet			
Test Configuration	Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
2-4	1/8/98	Xylenes (total)	ND	4200		ND	1300		
2-4	1/8/98	Styrene	ND	4200		ND	1300		
2-4	1/8/98	Bromoform	ND	4200		ND	1300		
2-4	1/8/98	1,1,2,2-Tetrachloroethane	ND	4200		ND	1300		
2-4	1/8/98	Benzyl chloride	ND	21000		ND	6600		
2-4	1/8/98	4-Ethyltoluene	ND	4200		ND	1300		
2-4	1/8/98	1,3,5-Trimethylbenzene	ND	4200		ND	1300		
2-4	1/8/98	1,2,4-Trimethylbenzene	ND	4200		ND	1300		
2-4	1/8/98	1,3-Dichlorobenzene	ND	4200		ND	1300		
2-4	1/8/98	1,4-Dichlorobenzene	ND	4200		ND	1300		
2-4	1/8/98	1,2-Dichlorobenzene	ND	4200		ND	1300		
2-4	1/8/98	1,2,4-Trichlorobenzene	ND	42000		ND	13000		
2-4	1/8/98	Hexachlorobutadiene	ND	8400		ND	2600		
		Total	**491,000**		**2.8114**	**169,200**		**1.1679**	**58.46**
2-5	12/21/97	Dichlorodifluoromethane	ND	360		ND	170		
2-5	12/21/97	Chloromethane	ND	720		ND	340		
2-5	12/21/97	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	360		ND	170		
2-5	12/21/97	Vinyl chloride	ND	360		ND	170		
2-5	12/21/97	Bromomethane	ND	360		ND	170		
2-5	12/21/97	Chloroethane	ND	720		ND	340		
2-5	12/21/97	Trichlorofluoromethane	ND	360		ND	170		
2-5	12/21/97	1,1-Dichloroethene	ND	360		ND	170		
2-5	12/21/97	Carbon disulfide	ND	1800		ND	840		
2-5	12/21/97	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	360		ND	170		
2-5	12/21/97	Acetone	ND	1800		ND	840		
2-5	12/21/97	Methylene chloride	ND	360		ND	170		
2-5	12/21/97	trans-1,2-Dichloroethene	ND	360		ND	170		
2-5	12/21/97	1,1-Dichloroethane	ND	360		ND	170		
2-5	12/21/97	Vinyl acetate	ND	1800		ND	840		
2-5	12/21/97	cis-1,2-Dichloroethene	21000	360	0.1278	13000	170	0.0791	38.10
2-5	12/21/97	2-Butanone	ND	1800		ND	840		
2-5	12/21/97	Chloroform	ND	360		ND	170		
2-5	12/21/97	1,1,1-Trichloroethane	ND	360		ND	170		
2-5	12/21/97	Carbon tetrachloride	ND	360		ND	170		
2-5	12/21/97	Benzene	ND	360		ND	170		
2-5	12/21/97	1,2-Dichloroethane	ND	360		ND	170		
2-5	12/21/97	Trichloroethene	39000	360	0.3216	18000	170	0.1484	53.85
2-5	12/21/97	1,2-Dichloropropane	ND	360		ND	170		

PTI DRE Method TO-14 Results Presented by Sample
Parametric Tests

			Inlet			Outlet			
Test Configuration	Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
2-5	12/21/97	Bromodichloromethane	ND	360		ND	170		
2-5	12/21/97	cis-1,3-Dichloropropene	ND	360		ND	170		
2-5	12/21/97	4-Methyl-2-pentanone	ND	1800		ND	840		
2-5	12/21/97	Toluene	1000	360	0.0058	530	170	0.0031	47.00
2-5	12/21/97	trans-1,3-Dichloropropene	ND	360		ND	170		
2-5	12/21/97	1,1,2-Trichloroethane	ND	360		ND	170		
2-5	12/21/97	Tetrachloroethene	11000	360	0.1145	4000	170	0.0416	63.64
2-5	12/21/97	2-Hexanone	ND	5400		ND	2500		
2-5	12/21/97	Dibromochloromethane	ND	360		ND	170		
2-5	12/21/97	1,2-Dibromoethane (EDB)	ND	360		ND	170		
2-5	12/21/97	Chlorobenzene	ND	360		ND	170		
2-5	12/21/97	Ethylbenzene	ND	360		ND	170		
2-5	12/21/97	Xylenes (total)	ND	360		ND	170		
2-5	12/21/97	Styrene	ND	360		ND	170		
2-5	12/21/97	Bromoform	ND	360		ND	170		
2-5	12/21/97	1,1,2,2-Tetrachloroethane	ND	360		ND	170		
2-5	12/21/97	Benzyl chloride	ND	1800		ND	840		
2-5	12/21/97	4-Ethyltoluene	ND	360		ND	170		
2-5	12/21/97	1,3,5-Trimethylbenzene	ND	360		ND	170		
2-5	12/21/97	1,2,4-Trimethylbenzene	ND	360		ND	170		
2-5	12/21/97	1,3-Dichlorobenzene	ND	360		ND	170		
2-5	12/21/97	1,4-Dichlorobenzene	ND	360		ND	170		
2-5	12/21/97	1,2-Dichlorobenzene	ND	360		ND	170		
2-5	12/21/97	1,2,4-Trichlorobenzene	ND	3600		ND	1700		
2-5	12/21/97	Hexachlorobutadiene	ND	720		ND	340		
		Total	**72,000**		**0.5697**	**35,530**		**0.2722**	**52.21**
2-6	12/20/97	Dichlorodifluoromethane	ND	2200		ND	1500		
2-6	12/20/97	Chloromethane	ND	4300		ND	3000		
2-6	12/20/97	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	2200		ND	1500		
2-6	12/20/97	Vinyl chloride	ND	2200		ND	1500		
2-6	12/20/97	Bromomethane	ND	2200		ND	1500		
2-6	12/20/97	Chloroethane	ND	4300		ND	3000		
2-6	12/20/97	Trichlorofluoromethane	ND	2200		ND	1500		
2-6	12/20/97	1,1-Dichloroethene	ND	2200		ND	1500		
2-6	12/20/97	Carbon disulfide	ND	11000		ND	7500		
2-6	12/20/97	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	2200		ND	1500		
2-6	12/20/97	Acetone	ND	11000		ND	7500		
2-6	12/20/97	Methylene chloride	ND	2200		ND	1500		

PTI DRE Method TO-14 Results Presented by Sample
Parametric Tests

			Inlet			Outlet			
Test Configuration	Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
2-6	12/20/97	trans-1,2-Dichloroethene	ND	2200		ND	1500		
2-6	12/20/97	1,1-Dichloroethane	ND	2200		ND	1500		
2-6	12/20/97	Vinyl acetate	ND	11000		ND	7500		
2-6	12/20/97	cis-1,2-Dichloroethene	150000	2200	0.8731	110000	1500	0.6402	26.67
2-6	12/20/97	2-Butanone	ND	11000		ND	7500		
2-6	12/20/97	Chloroform	ND	2200		ND	1500		
2-6	12/20/97	1,1,1-Trichloroethane	ND	2200		ND	1500		
2-6	12/20/97	Carbon tetrachloride	ND	2200		ND	1500		
2-6	12/20/97	Benzene	ND	2200		ND	1500		
2-6	12/20/97	1,2-Dichloroethane	ND	2200		ND	1500		
2-6	12/20/97	Trichloroethene	63000	2200	0.4967	42000	1500	0.3311	33.33
2-6	12/20/97	1,2-Dichloropropane	ND	2200		ND	1500		
2-6	12/20/97	Bromodichloromethane	ND	2200		ND	1500		
2-6	12/20/97	cis-1,3-Dichloropropene	ND	2200		ND	1500		
2-6	12/20/97	4-Methyl-2-pentanone	ND	11000		ND	7500		
2-6	12/20/97	Toluene	10000	2200	0.0553	3300	1500	0.0182	67.00
2-6	12/20/97	trans-1,3-Dichloropropene	ND	2200		ND	1500		
2-6	12/20/97	1,1,2-Trichloroethane	ND	2200		ND	1500		
2-6	12/20/97	Tetrachloroethene	35000	2200	0.3482	14000	1500	0.1393	60.00
2-6	12/20/97	2-Hexanone	ND	32000		ND	22000		
2-6	12/20/97	Dibromochloromethane	ND	2200		ND	1500		
2-6	12/20/97	1,2-Dibromoethane (EDB)	ND	2200		ND	1500		
2-6	12/20/97	Chlorobenzene	ND	2200		ND	1500		
2-6	12/20/97	Ethylbenzene	ND	2200		ND	1500		
2-6	12/20/97	Xylenes (total)	ND	2200		ND	1500		
2-6	12/20/97	Styrene	ND	2200		ND	1500		
2-6	12/20/97	Bromoform	ND	2200		ND	1500		
2-6	12/20/97	1,1,2,2-Tetrachloroethane	ND	2200		ND	1500		
2-6	12/20/97	Benzyl chloride	ND	11000		ND	7500		
2-6	12/20/97	4-Ethyltoluene	ND	2200		ND	1500		
2-6	12/20/97	1,3,5-Trimethylbenzene	ND	2200		ND	1500		
2-6	12/20/97	1,2,4-Trimethylbenzene	ND	2200		ND	1500		
2-6	12/20/97	1,3-Dichlorobenzene	ND	2200		ND	1500		
2-6	12/20/97	1,4-Dichlorobenzene	ND	2200		ND	1500		
2-6	12/20/97	1,2-Dichlorobenzene	ND	2200		ND	1500		
2-6	12/20/97	1,2,4-Trichlorobenzene	ND	22000		ND	15000		
2-6	12/20/97	Hexachlorobutadiene	ND	4300		ND	3000		
		Total	**258,000**		**1.7732**	**169,300**		**1.1289**	**36.34**

PTI DRE Method TO-14 Results Presented by Sample
Parametric Tests

			Inlet			Outlet			
Test Configuration	Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
3-1	1/7/98	Dichlorodifluoromethane	ND	2000		ND	1100		
3-1	1/7/98	Chloromethane	ND	4000		ND	2200		
3-1	1/7/98	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	2000		ND	1100		
3-1	1/7/98	Vinyl chloride	ND	2000		ND	1100		
3-1	1/7/98	Bromomethane	ND	2000		ND	1100		
3-1	1/7/98	Chloroethane	ND	4000		ND	2200		
3-1	1/7/98	Trichlorofluoromethane	ND	2000		ND	1100		
3-1	1/7/98	1,1-Dichloroethene	ND	2000		ND	1100		
3-1	1/7/98	Carbon disulfide	ND	9900		ND	5400		
3-1	1/7/98	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	2000		ND	1100		
3-1	1/7/98	Acetone	ND	9900		ND	5400		
3-1	1/7/98	Methylene chloride	ND	2000		ND	1100		
3-1	1/7/98	trans-1,2-Dichloroethene	ND	2000		ND	1100		
3-1	1/7/98	1,1-Dichloroethane	ND	2000		ND	1100		
3-1	1/7/98	Vinyl acetate	ND	9900		ND	5400		
3-1	1/7/98	cis-1,2-Dichloroethene	240000	2000	1.5105	90000	1100	0.5778	61.75
3-1	1/7/98	2-Butanone	ND	9900		ND	5400		
3-1	1/7/98	Chloroform	ND	2000		ND	1100		
3-1	1/7/98	1,1,1-Trichloroethane	ND	2000		ND	1100		
3-1	1/7/98	Carbon tetrachloride	ND	2000		ND	1100		
3-1	1/7/98	Benzene	ND	2000		ND	1100		
3-1	1/7/98	1,2-Dichloroethane	ND	2000		ND	1100		
3-1	1/7/98	Trichloroethene	85000	2000	0.7247	18000	1100	0.1565	78.40
3-1	1/7/98	1,2-Dichloropropane	ND	2000		ND	1100		
3-1	1/7/98	Bromodichloromethane	ND	2000		ND	1100		
3-1	1/7/98	cis-1,3-Dichloropropene	ND	2000		ND	1100		
3-1	1/7/98	4-Methyl-2-pentanone	ND	9900		ND	5400		
3-1	1/7/98	Toluene	16000	2000	0.0956	ND	1100		>92.99
3-1	1/7/98	trans-1,3-Dichloropropene	ND	2000		ND	1100		
3-1	1/7/98	1,1,2-Trichloroethane	ND	2000		ND	1100		
3-1	1/7/98	Tetrachloroethene	45000	2000	0.4841	5200	1100	0.0571	88.21
3-1	1/7/98	2-Hexanone	ND	30000		ND	16000		
3-1	1/7/98	Dibromochloromethane	ND	2000		ND	1100		
3-1	1/7/98	1,2-Dibromoethane (EDB)	ND	2000		ND	1100		
3-1	1/7/98	Chlorobenzene	ND	2000		ND	1100		
3-1	1/7/98	Ethylbenzene	ND	2000		ND	1100		
3-1	1/7/98	Xylenes (total)	ND	2000		ND	1100		
3-1	1/7/98	Styrene	ND	2000		ND	1100		
3-1	1/7/98	Bromoform	ND	2000		ND	1100		

PTI DRE Method TO-14 Results Presented by Sample
Parametric Tests

			Inlet			Outlet			
Test Configuration	Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
3-1	1/7/98	1,1,2,2-Tetrachloroethane	ND	2000		ND	1100		
3-1	1/7/98	Benzyl chloride	ND	9900		ND	5400		
3-1	1/7/98	4-Ethyltoluene	ND	2000		ND	1100		
3-1	1/7/98	1,3,5-Trimethylbenzene	ND	2000		ND	1100		
3-1	1/7/98	1,2,4-Trimethylbenzene	ND	2000		ND	1100		
3-1	1/7/98	1,3-Dichlorobenzene	ND	2000		ND	1100		
3-1	1/7/98	1,4-Dichlorobenzene	ND	2000		ND	1100		
3-1	1/7/98	1,2-Dichlorobenzene	ND	2000		ND	1100		
3-1	1/7/98	1,2,4-Trichlorobenzene	ND	20000		ND	11000		
3-1	1/7/98	Hexachlorobutadiene	ND	4000		ND	2200		
		Total	386,000		2.8148	113,200		0.7913	>71.89

PTI System DRE (NMOC) Results Presented by Date
Parametric Tests

Date	Test Configuration	Inlet Concentration (ppmc)	Outlet Concentration (ppmc)	DRE (%)
10/24/97	1-2	NA	NA	NA
10/25/97	1-3	NA	NA	NA
10/26/97	1-4	NA	NA	NA
10/27/97	1-5	NA	NA	NA
11/1/97	1-6	790	190	75.95
Average		790	190	**75.95**
11/6/97	1-4a	450	41	90.89
11/17/97	1-5a	698	64	90.83
11/18/97	1-6a	705	212	69.93
Average		618	106	**83.88**
11/20/97	2-6	620	392	36.77
12/19/97	2-5	161	83	48.45
1/7/98	2-3	961	217	77.42
1/8/98	2-4	1,311	455	65.29
1/8/98	2-2	875	453	48.23
Average		786	320	**55.23**
1/7/98	3-1	1,075	294	72.65
Average		1,075	294	**72.65**

Note:
"NA" denotes no sample collected on this date.

PDU System DRE (Method TO-14) Results Presented by Sample
Parametric Tests

			Inlet			Outlet			
Test Configuration	Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1-5A	11/17/97	Dichlorodifluoromethane	ND	11000		ND	32		
1-5A	11/17/97	Chloromethane	ND	22000		260	63	9.712E-06	
1-5A	11/17/97	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	11000		ND	32		
1-5A	11/17/97	Vinyl chloride	ND	11000		ND	32		
1-5A	11/17/97	Bromomethane	ND	11000		ND	32		
1-5A	11/17/97	Chloroethane	ND	22000		ND	63		
1-5A	11/17/97	Trichlorofluoromethane	ND	11000		ND	32		
1-5A	11/17/97	1,1-Dichloroethene	ND	11000		ND	32		
1-5A	11/17/97	Carbon disulfide	ND	55000		ND	160		
1-5A	11/17/97	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	11000		ND	32		
1-5A	11/17/97	Acetone	ND	55000		310	160	1.332E-05	
1-5A	11/17/97	Methylene chloride	ND	11000		620	32	3.893E-05	
1-5A	11/17/97	trans-1,2-Dichloroethene	ND	11000		ND	32		
1-5A	11/17/97	1,1-Dichloroethane	ND	11000		ND	32		
1-5A	11/17/97	Vinyl acetate	ND	55000		ND	160		
1-5A	11/17/97	cis-1,2-Dichloroethene	940000	11000	0.0674	ND	32		>99.99
1-5A	11/17/97	2-Butanone	ND	55000		ND	160		
1-5A	11/17/97	Chloroform	ND	11000		2900	32	0.0002561	
1-5A	11/17/97	1,1,1-Trichloroethane	ND	11000		ND	32		
1-5A	11/17/97	Carbon tetrachloride	ND	11000		88	32	1.001E-05	
1-5A	11/17/97	Benzene	ND	11000		ND	32		
1-5A	11/17/97	1,2-Dichloroethane	ND	11000		71	32	5.199E-06	
1-5A	11/17/97	Trichloroethene	420000	11000	0.0408	ND	32		>99.99
1-5A	11/17/97	1,2-Dichloropropane	ND	11000		ND	32		
1-5A	11/17/97	Bromodichloromethane	ND	11000		ND	32		
1-5A	11/17/97	cis-1,3-Dichloropropene	ND	11000		ND	32		
1-5A	11/17/97	4-Methyl-2-pentanone	ND	55000		ND	160		
1-5A	11/17/97	Toluene	ND	11000		ND	32		
1-5A	11/17/97	trans-1,3-Dichloropropene	ND	11000		ND	32		
1-5A	11/17/97	1,1,2-Trichloroethane	ND	11000		ND	32		
1-5A	11/17/97	Tetrachloroethene	160000	11000	0.0196	ND	32		>99.98
1-5A	11/17/97	2-Hexanone	ND	160000		ND	470		
1-5A	11/17/97	Dibromochloromethane	ND	11000		ND	32		

PDU System DRE (Method TO-14) Results Presented by Sample
Parametric Tests

			Inlet			Outlet			
Test Configuration	Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1-5A	11/17/97	1,2-Dibromoethane (EDB)	ND	11000		ND	32		
1-5A	11/17/97	Chlorobenzene	ND	11000		ND	32		
1-5A	11/17/97	Ethylbenzene	ND	11000		ND	32		
1-5A	11/17/97	Xylenes (total)	ND	11000		ND	32		
1-5A	11/17/97	Styrene	ND	11000		ND	32		
1-5A	11/17/97	Bromoform	ND	11000		ND	32		
1-5A	11/17/97	1,1,2,2-Tetrachloroethane	ND	11000		ND	32		
1-5A	11/17/97	Benzyl chloride	ND	55000		ND	160		
1-5A	11/17/97	4-Ethyltoluene	ND	11000		ND	32		
1-5A	11/17/97	1,3,5-Trimethylbenzene	ND	11000		ND	32		
1-5A	11/17/97	1,2,4-Trimethylbenzene	ND	11000		ND	32		
1-5A	11/17/97	1,3-Dichlorobenzene	ND	11000		ND	32		
1-5A	11/17/97	1,4-Dichlorobenzene	ND	11000		ND	32		
1-5A	11/17/97	1,2-Dichlorobenzene	ND	11000		ND	32		
1-5A	11/17/97	1,2,4-Trichlorobenzene	ND	110000		ND	320		
1-5A	11/17/97	Hexachlorobutadiene	ND	22000		ND	63		
		Total	**1,520,000**		**0.1279**	**4,249**		**0.0003**	**>99.74**
1-6A	11/18/97	Dichlorodifluoromethane	ND	19000		ND	170		
1-6A	11/18/97	Chloromethane	ND	39000		520	350	2.249E-05	
1-6A	11/18/97	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	19000		ND	170		
1-6A	11/18/97	Vinyl chloride	ND	19000		ND	170		
1-6A	11/18/97	Bromomethane	ND	19000		ND	170		
1-6A	11/18/97	Chloroethane	ND	39000		ND	350		
1-6A	11/18/97	Trichlorofluoromethane	ND	19000		ND	170		
1-6A	11/18/97	1,1-Dichloroethene	ND	19000		ND	170		
1-6A	11/18/97	Carbon disulfide	ND	97000		ND	860		
1-6A	11/18/97	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	19000		ND	170		
1-6A	11/18/97	Acetone	ND	97000		1800	860	8.957E-05	
1-6A	11/18/97	Methylene chloride	ND	19000		4000	170	0.0002909	
1-6A	11/18/97	trans-1,2-Dichloroethene	26000	19000	0.0022	ND	170		>99.34
1-6A	11/18/97	1,1-Dichloroethane	ND	19000		ND	170		
1-6A	11/18/97	Vinyl acetate	ND	97000		ND	860		

PDU System DRE (Method TO-14) Results Presented by Sample
Parametric Tests

			Inlet			Outlet			
Test Configuration	Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1-6A	11/18/97	cis-1,2-Dichloroethene	4200000	19000	0.3489	ND	170		>99.99
1-6A	11/18/97	2-Butanone	ND	97000		ND	860		
1-6A	11/18/97	Chloroform	ND	19000		19000	170	0.0019429	
1-6A	11/18/97	1,1,1-Trichloroethane	ND	19000		ND	170		
1-6A	11/18/97	Carbon tetrachloride	ND	19000		600	170	7.903E-05	
1-6A	11/18/97	Benzene	ND	19000		1300	170	8.696E-05	
1-6A	11/18/97	1,2-Dichloroethane	ND	19000		1000	170	8.479E-05	
1-6A	11/18/97	Trichloroethene	1600000	19000	0.1801	ND	170		>99.98
1-6A	11/18/97	1,2-Dichloropropane	ND	19000		ND	170		
1-6A	11/18/97	Bromodichloromethane	ND	19000		ND	170		
1-6A	11/18/97	cis-1,3-Dichloropropene	ND	19000		ND	170		
1-6A	11/18/97	4-Methyl-2-pentanone	ND	97000		ND	860		
1-6A	11/18/97	Toluene	140000	19000	0.0110	ND	170	2.475E-05	99.78
1-6A	11/18/97	trans-1,3-Dichloropropene	ND	19000		ND	170		
1-6A	11/18/97	1,1,2-Trichloroethane	ND	19000		ND	170		
1-6A	11/18/97	Tetrachloroethene	400000	19000	0.0568	ND	170	2.475E-05	99.96
1-6A	11/18/97	2-Hexanone	ND	290000		ND	2600		
1-6A	11/18/97	Dibromochloromethane	ND	19000		ND	170		
1-6A	11/18/97	1,2-Dibromoethane (EDB)	ND	19000		ND	170		
1-6A	11/18/97	Chlorobenzene	ND	19000		ND	170		
1-6A	11/18/97	Ethylbenzene	ND	19000		ND	170		
1-6A	11/18/97	Xylenes (total)	ND	19000		ND	170		
1-6A	11/18/97	Styrene	ND	19000		ND	170		
1-6A	11/18/97	Bromoform	ND	19000		ND	170		
1-6A	11/18/97	1,1,2,2-Tetrachloroethane	ND	19000		ND	170		
1-6A	11/18/97	Benzyl chloride	ND	97000		ND	860		
1-6A	11/18/97	4-Ethyltoluene	ND	19000		ND	170		
1-6A	11/18/97	1,3,5-Trimethylbenzene	ND	19000		ND	170		
1-6A	11/18/97	1,2,4-Trimethylbenzene	ND	19000		ND	170		
1-6A	11/18/97	1,3-Dichlorobenzene	ND	19000		ND	170		
1-6A	11/18/97	1,4-Dichlorobenzene	ND	19000		ND	170		
1-6A	11/18/97	1,2-Dichlorobenzene	ND	19000		ND	170		
1-6A	11/18/97	1,2,4-Trichlorobenzene	ND	190000		ND	1700		

PDU System DRE (Method TO-14) Results Presented by Sample
Parametric Tests

			Inlet			Outlet			
Test Configuration	Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1-6A	11/18/97	Hexachlorobutadiene	ND	39000		ND	350		
		Total	**6,366,000**		**0.5990**	**28,220**		**0.0026**	**>99.56**
3-1	1/7/98	Dichlorodifluoromethane	ND	86000		ND	390		
3-1	1/7/98	Chloromethane	ND	170000		ND	780		
3-1	1/7/98	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	86000		ND	390		
3-1	1/7/98	Vinyl chloride	ND	86000		ND	390		
3-1	1/7/98	Bromomethane	ND	86000		ND	390		
3-1	1/7/98	Chloroethane	ND	170000		ND	780		
3-1	1/7/98	Trichlorofluoromethane	ND	86000		ND	390		
3-1	1/7/98	1,1-Dichloroethene	ND	86000		ND	390		
3-1	1/7/98	Carbon disulfide	ND	430000		ND	2000		
3-1	1/7/98	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	86000		ND	390		
3-1	1/7/98	Acetone	ND	430000		6600	2000	0.0003	
3-1	1/7/98	Methylene chloride	ND	86000		7400	390	0.0005	
3-1	1/7/98	trans-1,2-Dichloroethene	ND	86000		10000	390	0.0007	
3-1	1/7/98	1,1-Dichloroethane	ND	86000		ND	390		
3-1	1/7/98	Vinyl acetate	ND	430000		ND	2000		
3-1	1/7/98	cis-1,2-Dichloroethene	6800000	86000	0.4999	27000	390	0.0020	99.60
3-1	1/7/98	2-Butanone	ND	430000		ND	2000		
3-1	1/7/98	Chloroform	ND	86000		49000	390	0.0044	
3-1	1/7/98	1,1,1-Trichloroethane	ND	86000		ND	390		
3-1	1/7/98	Carbon tetrachloride	ND	86000		510	390	5.944E-05	
3-1	1/7/98	Benzene	ND	86000		4400	390	0.0003	
3-1	1/7/98	1,2-Dichloroethane	ND	86000		3500	390	0.0003	
3-1	1/7/98	Trichloroethene	2400000	86000	0.2390	18000	390	0.0018	99.25
3-1	1/7/98	1,2-Dichloropropane	ND	86000		740	390	6.337E-05	
3-1	1/7/98	Bromodichloromethane	ND	86000		ND	390		
3-1	1/7/98	cis-1,3-Dichloropropene	ND	86000		ND	390		
3-1	1/7/98	4-Methyl-2-pentanone	ND	430000		ND	2000		
3-1	1/7/98	Toluene	280000	86000	0.0195	2500	390	0.0002	99.11
3-1	1/7/98	trans-1,3-Dichloropropene	ND	86000		ND	390		
3-1	1/7/98	1,1,2-Trichloroethane	ND	86000		ND	390		

PDU System DRE (Method TO-14) Results Presented by Sample
Parametric Tests

			Inlet			Outlet			
Test Configuration	Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
3-1	1/7/98	Tetrachloroethene	840000	86000	0.1055	8800	390	0.0011	98.95
3-1	1/7/98	2-Hexanone	ND	130000		ND	5900		
3-1	1/7/98	Dibromochloromethane	ND	86000		ND	390		
3-1	1/7/98	1,2-Dibromoethane (EDB)	ND	86000		ND	390		
3-1	1/7/98	Chlorobenzene	ND	86000		ND	390		
3-1	1/7/98	Ethylbenzene	ND	86000		ND	390		
3-1	1/7/98	Xylenes (total)	ND	86000		ND	390		
3-1	1/7/98	Styrene	ND	86000		ND	390		
3-1	1/7/98	Bromoform	ND	86000		ND	390		
3-1	1/7/98	1,1,2,2-Tetrachloroethane	ND	86000		ND	390		
3-1	1/7/98	Benzyl chloride	ND	430000		ND	2000		
3-1	1/7/98	4-Ethyltoluene	ND	86000		ND	390		
3-1	1/7/98	1,3,5-Trimethylbenzene	ND	86000		ND	390		
3-1	1/7/98	1,2,4-Trimethylbenzene	ND	86000		ND	390		
3-1	1/7/98	1,3-Dichlorobenzene	ND	86000		ND	390		
3-1	1/7/98	1,4-Dichlorobenzene	ND	86000		ND	390		
3-1	1/7/98	1,2-Dichlorobenzene	ND	86000		ND	390		
3-1	1/7/98	1,2,4-Trichlorobenzene	ND	860000		ND	3900		
3-1	1/7/98	Hexachlorobutadiene	ND	170000		ND	780		
		Total	**10,320,000**		**0.8639**	**138,450**		**0.0116**	**98.65**

PDU DRE (NMOC) Results Presented by Date
Parametric Tests

Date	Test Configuration	Inlet Concentration (ppmc)	Outlet Concentration (ppmc)	DRE (%)
10/24/97	1-2	NA	NA	NA
10/25/97	1-3	NA	NA	NA
10/26/97	1-4	NA	NA	NA
10/27/97	1-5	NA	NA	NA
11/1/97	1-6	NA	NA	NA
Average		NA	NA	**NA**
11/6/97	1-4a	NA	NA	NA
11/17/97	1-5a	5,025	5	99.91
11/18/97	1-6a	14,899	32	99.78
Average		9,962	19	**99.84**
11/20/97	2-6	NA	NA	NA
12/19/97	2-5	NA	NA	NA
1/7/98	2-3	NA	NA	NA
1/8/98	2-4	NA	NA	NA
1/8/98	2-2	NA	NA	NA
Average		NA	NA	**NA**
1/7/98	3-1	24,922	351	98.59
Average		24,922	351	**98.59**

Note:
"NA" denotes no sample collected on this date.

APPENDIX C
SUMMARY OF STEADY-STATE TESTS
FID, TO-14 AND NMOC RESULTS

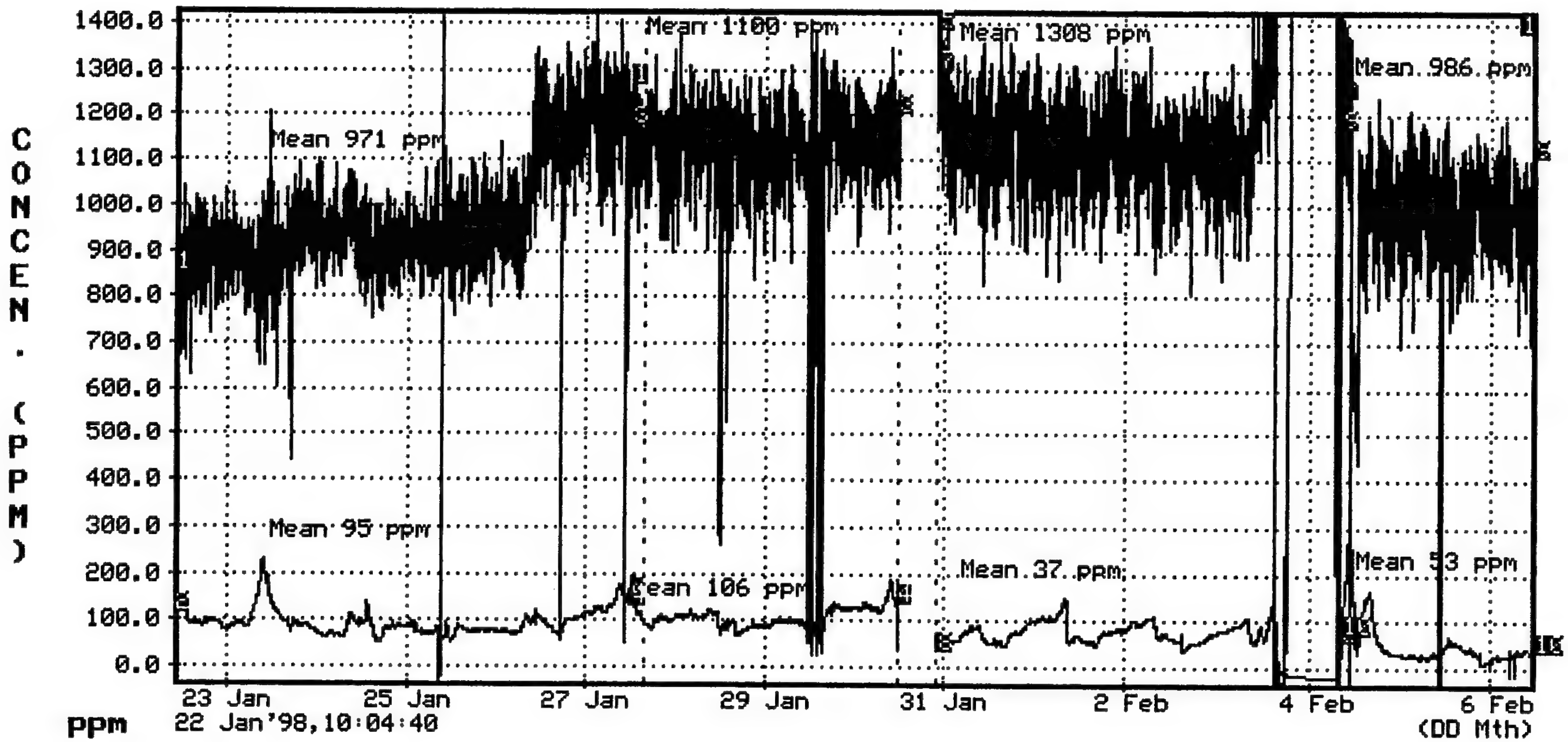
Contents:

PTI System DRE (FID) Results
PTI System DRE (Method TO-14) Results
PTI System DRE (NMOC) Results
PDU System DRE (Method TO-14) Results
PDU System DRE (NMOC) Results

PTI System DRE (FID) Results Presented by Date
Steady-State Tests

Date	Inlet Concentration (ppmc)	Outlet Concentration (ppmc)	DRE (%)
1/19/98	890	170	80.90
1/22/98	920	124	86.52
1/26/98	1,175	83	92.94
1/30/98	1,141	93	91.85
2/4/98	1,090	49	95.50
2/5/98	1,020	33	96.76
2/5/98	1,020	14	98.63
2/6/98	1,010	31	96.93
Average	1,033	75	**92.50**

PTI System Inlet and Outlet VOC (FID) Concentrations
Data Logger Recording
Steady-State Tests



PTI System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

Summary Data					
	Inlet		Outlet		Average
Compound Name	Concentration (ppmv)	Mass Rate (lbs/hr)	Concentration (ppmv)	Mass Rate (lbs/hr)	DRE %
Tetrachloroethene	31.40	0.2703	2.44	0.0278	89.72%
Trichloroethene	27.60	0.1895	4.02	0.0363	80.83%
cis-1,2-Dichloroethene	22.20	0.1129	4.40	0.0294	73.98%
Toluene	14.20	0.0679	0.74	0.0047	93.13%
Totals	191.84	1.2238	11.65	0.0986	91.94%

PTI System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

		Inlet			Outlet			
Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1/19/98	Dichlorodifluoromethane	ND	520		ND	220		
1/19/98	Chloromethane	ND	1000		ND	430		
1/19/98	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	520		ND	220		
1/19/98	Vinyl chloride	ND	520		ND	220		
1/19/98	Bromomethane	ND	520		ND	220		
1/19/98	Chloroethane	ND	1000		ND	430		
1/19/98	Trichlorofluoromethane	ND	520		ND	220		
1/19/98	1,1-Dichloroethene	ND	520		ND	220		
1/19/98	Carbon disulfide	ND	2600		ND	1100		
1/19/98	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	520		ND	220		
1/19/98	Acetone	ND	2600		ND	1100		
1/19/98	Methylene chloride	ND	520		230	220	0.0012	
1/19/98	trans-1,2-Dichloroethene	ND	520		ND	220		
1/19/98	1,1-Dichloroethane	ND	520		ND	220		
1/19/98	Vinyl acetate	ND	2600		ND	1100		
1/19/98	cis-1,2-Dichloroethene	43000	520	0.2156	24000	220	0.1439	33.26
1/19/98	2-Butanone	ND	2600		ND	1100		
1/19/98	Chloroform	ND	520		ND	220		
1/19/98	1,1,1-Trichloroethane	ND	520		ND	220		
1/19/98	Carbon tetrachloride	ND	520		ND	220		
1/19/98	Benzene	ND	520		ND	220		
1/19/98	1,2-Dichloroethane	ND	520		ND	220		
1/19/98	Trichloroethene	32000	520	0.2174	10000	220	0.0812	62.63
1/19/98	1,2-Dichloropropane	ND	520		ND	220		
1/19/98	Bromodichloromethane	ND	520		ND	220		
1/19/98	cis-1,3-Dichloropropene	ND	520		ND	220		
1/19/98	4-Methyl-2-pentanone	ND	2600		ND	1100		
1/19/98	Toluene	11000	520	0.0524	880	220	0.0050	90.43
1/19/98	trans-1,3-Dichloropropene	ND	520		ND	220		
1/19/98	1,1,2-Trichloroethane	ND	520		ND	220		

PTI System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

		Inlet			Outlet			
Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1/19/98	Tetrachloroethene	23000	520	0.1971	3800	220	0.0389	80.24
1/19/98	2-Hexanone	ND	7800		ND	3200		
1/19/98	Dibromochloromethane	ND	520		ND	220		
1/19/98	1,2-Dibromoethane (EDB)	ND	520		ND	220		
1/19/98	Chlorobenzene	ND	520		ND	220		
1/19/98	Ethylbenzene	ND	520		ND	220		
1/19/98	Xylenes (total)	770	520	0.0042	ND	220		>65.83
1/19/98	Styrene	ND	520		ND	220		
1/19/98	Bromoform	ND	520		ND	220		
1/19/98	1,1,2,2-Tetrachloroethane	ND	520		ND	220		
1/19/98	Benzyl chloride	ND	2600		ND	1100		
1/19/98	4-Ethyltoluene	ND	520		ND	220		
1/19/98	1,3,5-Trimethylbenzene	ND	520		ND	220		
1/19/98	1,2,4-Trimethylbenzene	ND	520		ND	220		
1/19/98	1,3-Dichlorobenzene	ND	520		ND	220		
1/19/98	1,4-Dichlorobenzene	ND	520		ND	220		
1/19/98	1,2-Dichlorobenzene	ND	520		ND	220		
1/19/98	1,2,4-Trichlorobenzene	ND	5200		ND	2200		
1/19/98	Hexachlorobutadiene	ND	1000		ND	430		
	Total	**109,770**		**0.6868**	**38,910**		**0.2703**	**60.64**
1/22/98	Dichlorodifluoromethane	ND	530		ND	220		
1/22/98	Chloromethane	ND	1100		ND	450		
1/22/98	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	530		ND	220		
1/22/98	Vinyl chloride	ND	530		ND	220		
1/22/98	Bromomethane	ND	530		ND	220		
1/22/98	Chloroethane	ND	1100		ND	450		
1/22/98	Trichlorofluoromethane	ND	530		ND	220		
1/22/98	1,1-Dichloroethene	ND	530		ND	220		
1/22/98	Carbon disulfide	ND	2700		ND	1100		

PTI System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

		Inlet			Outlet			
Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1/22/98	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	530		ND	220		
1/22/98	Acetone	ND	2700		ND	1100		
1/22/98	Methylene chloride	ND	530		310	220	0.0017	
1/22/98	trans-1,2-Dichloroethene	ND	530		ND	220		
1/22/98	1,1-Dichloroethane	ND	530		ND	220		
1/22/98	Vinyl acetate	ND	2700		ND	1100		
1/22/98	cis-1,2-Dichloroethene	32000	530	0.1486	17000	220	0.1060	28.65
1/22/98	2-Butanone	ND	2700		ND	1100		
1/22/98	Chloroform	ND	530		270	220	0.0021	
1/22/98	1,1,1-Trichloroethane	ND	530		ND	220		
1/22/98	Carbon tetrachloride	ND	530		ND	220		
1/22/98	Benzene	ND	530		ND	220		
1/22/98	1,2-Dichloroethane	ND	530		ND	220		
1/22/98	Trichloroethene	37000	530	0.2328	10000	220	0.0845	63.70
1/22/98	1,2-Dichloropropane	ND	530		ND	220		
1/22/98	Bromodichloromethane	ND	530		ND	220		
1/22/98	cis-1,3-Dichloropropene	ND	530		ND	220		
1/22/98	4-Methyl-2-pentanone	ND	2700		ND	1100		
1/22/98	Toluene	13000	530	0.0573	1500	220	0.0089	84.50
1/22/98	trans-1,3-Dichloropropene	ND	530		ND	220		
1/22/98	1,1,2-Trichloroethane	ND	530		ND	220		
1/22/98	Tetrachloroethene	26000	530	0.2064	3900	220	0.0416	79.85
1/22/98	2-Hexanone	ND	8000		ND	3400		
1/22/98	Dibromochloromethane	ND	530		ND	220		
1/22/98	1,2-Dibromoethane (EDB)	ND	530		ND	220		
1/22/98	Chlorobenzene	ND	530		ND	220		
1/22/98	Ethylbenzene	ND	530		ND	220		
1/22/98	Xylenes (total)	1000	530	0.0051	ND	220		>70.45
1/22/98	Styrene	ND	530		ND	220		
1/22/98	Bromoform	ND	530		ND	220		

PTI System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

		Inlet			Outlet			
Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1/22/98	1,1,2,2-Tetrachloroethane	ND	530		ND	220		
1/22/98	Benzyl chloride	ND	2700		ND	1100		
1/22/98	4-Ethyltoluene	ND	530		ND	220		
1/22/98	1,3,5-Trimethylbenzene	ND	530		ND	220		
1/22/98	1,2,4-Trimethylbenzene	870	530	0.0050	ND	220		>66.03
1/22/98	1,3-Dichlorobenzene	ND	530		ND	220		
1/22/98	1,4-Dichlorobenzene	ND	530		ND	220		
1/22/98	1,2-Dichlorobenzene	ND	530		ND	220		
1/22/98	1,2,4-Trichlorobenzene	ND	5300		ND	2200		
1/22/98	Hexachlorobutadiene	ND	1100		ND	450		
	Total	**109,870**		**0.6553**	**32,980**		**0.2448**	**62.64**
1/26/98	Dichlorodifluoromethane	ND	550		ND	220		
1/26/98	Chloromethane	ND	1100		ND	450		
1/26/98	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	550		ND	220		
1/26/98	Vinyl chloride	ND	550		ND	220		
1/26/98	Bromomethane	ND	550		ND	220		
1/26/98	Chloroethane	ND	1100		ND	450		
1/26/98	Trichlorofluoromethane	ND	550		ND	220		
1/26/98	1,1-Dichloroethene	ND	550		ND	220		
1/26/98	Carbon disulfide	ND	2700		ND	1100		
1/26/98	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	550		ND	220		
1/26/98	Acetone	ND	2700		ND	1100		
1/26/98	Methylene chloride	ND	550		310	220	0.0018	
1/26/98	trans-1,2-Dichloroethene	ND	550		ND	220		
1/26/98	1,1-Dichloroethane	ND	550		ND	220		
1/26/98	Vinyl acetate	ND	2700		ND	1100		
1/26/98	cis-1,2-Dichloroethene	38000	550	0.2043	14000	220	0.0930	54.46
1/26/98	2-Butanone	ND	2700		ND	1100		
1/26/98	Chloroform	ND	550		270	220	0.0022	

PTI System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

		Inlet			Outlet			
Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1/26/98	1,1,1-Trichloroethane	ND	550		360	220	0.0033	
1/26/98	Carbon tetrachloride	ND	550		ND	220		
1/26/98	Benzene	ND	550		ND	220		
1/26/98	1,2-Dichloroethane	ND	550		ND	220		
1/26/98	Trichloroethene	41000	550	0.2987	9900	220	0.0891	70.16
1/26/98	1,2-Dichloropropane	ND	550		ND	220		
1/26/98	Bromodichloromethane	ND	550		ND	220		
1/26/98	cis-1,3-Dichloropropene	ND	550		ND	220		
1/26/98	4-Methyl-2-pentanone	ND	2700		ND	1100		
1/26/98	Toluene	17000	550	0.0868	1400	220	0.0088	89.82
1/26/98	trans-1,3-Dichloropropene	ND	550		ND	220		
1/26/98	1,1,2-Trichloroethane	ND	550		ND	220		
1/26/98	Tetrachloroethene	38000	550	0.3493	5000	220	0.0568	83.74
1/26/98	2-Hexanone	ND	8200		ND	3400		
1/26/98	Dibromochloromethane	ND	550		ND	220		
1/26/98	1,2-Dibromoethane (EDB)	ND	550		ND	220		
1/26/98	Chlorobenzene	ND	550		ND	220		
1/26/98	Ethylbenzene	ND	550		ND	220		
1/26/98	Xylenes (total)	2500	550	0.0147	ND	220		>89.12
1/26/98	Styrene	ND	550		ND	220		
1/26/98	Bromoform	ND	550		ND	220		
1/26/98	1,1,2,2-Tetrachloroethane	ND	550		ND	220		
1/26/98	Benzyl chloride	ND	2700		ND	1100		
1/26/98	4-Ethyltoluene	900	550	0.0056	ND	220		>69.78
1/26/98	1,3,5-Trimethylbenzene	570	550	0.0038	ND	220		>52.29
1/26/98	1,2,4-Trimethylbenzene	1700	550	0.0113	ND	220		>84.00
1/26/98	1,3-Dichlorobenzene	ND	550		ND	220		
1/26/98	1,4-Dichlorobenzene	ND	550		ND	220		
1/26/98	1,2-Dichlorobenzene	620	550	0.0051	ND	220		>56.14
1/26/98	1,2,4-Trichlorobenzene	ND	5500		ND	2200		

PTI System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

		Inlet			Outlet			
Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1/26/98	Hexachlorobutadiene	ND	1100		ND	450		
	Total	**140,290**		**0.9796**	**31,240**		**0.2551**	**73.96**
1/30/98	Dichlorodifluoromethane	ND	340		ND	81		
1/30/98	Chloromethane	ND	670		ND	160		
1/30/98	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	340		ND	81		
1/30/98	Vinyl chloride	ND	340		ND	81		
1/30/98	Bromomethane	ND	340		ND	81		
1/30/98	Chloroethane	ND	670		ND	160		
1/30/98	Trichlorofluoromethane	ND	340		ND	81		
1/30/98	1,1-Dichloroethene	ND	340		ND	81		
1/30/98	Carbon disulfide	ND	1700		ND	400		
1/30/98	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	340		ND	81		
1/30/98	Acetone	ND	1700		ND	400		
1/30/98	Methylene chloride	ND	340		120	81	0.0007	
1/30/98	trans-1,2-Dichloroethene	ND	340		ND	81		
1/30/98	1,1-Dichloroethane	ND	340		ND	81		
1/30/98	Vinyl acetate	ND	1700		ND	400		
1/30/98	cis-1,2-Dichloroethene	22000	340	0.1121	4100	81	0.0281	74.98
1/30/98	2-Butanone	ND	1700		ND	400		
1/30/98	Chloroform	ND	340		120	81	0.0010	
1/30/98	1,1,1-Trichloroethane	ND	340		ND	81		
1/30/98	Carbon tetrachloride	ND	340		ND	81		
1/30/98	Benzene	ND	340		ND	81		
1/30/98	1,2-Dichloroethane	ND	340		ND	81		
1/30/98	Trichloroethene	32000	340	0.2209	4200	81	0.0389	82.38
1/30/98	1,2-Dichloropropane	ND	340		ND	81		
1/30/98	Bromodichloromethane	ND	340		ND	81		
1/30/98	cis-1,3-Dichloropropene	ND	340		ND	81		
1/30/98	4-Methyl-2-pentanone	ND	1700		ND	400		

PTI System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

		Inlet			Outlet			
Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1/30/98	Toluene	15000	340	0.0726	610	81	0.0040	94.54
1/30/98	trans-1,3-Dichloropropene	ND	340		ND	81		
1/30/98	1,1,2-Trichloroethane	ND	340		ND	81		
1/30/98	Tetrachloroethene	33000	340	0.2875	2200	81	0.0257	91.05
1/30/98	2-Hexanone	ND	5100		ND	1200		
1/30/98	Dibromochloromethane	ND	340		ND	81		
1/30/98	1,2-Dibromoethane (EDB)	ND	340		ND	81		
1/30/98	Chlorobenzene	ND	340		ND	81		
1/30/98	Ethylbenzene	ND	340		ND	81		
1/30/98	Xylenes (total)	1900	340	0.0106	ND	81		>94.27
1/30/98	Styrene	ND	340		ND	81		
1/30/98	Bromoform	ND	340		ND	81		
1/30/98	1,1,2,2-Tetrachloroethane	ND	340		ND	81		
1/30/98	Benzyl chloride	ND	1700		ND	400		
1/30/98	4-Ethyltoluene	750	340	0.0045	ND	81		>85.50
1/30/98	1,3,5-Trimethylbenzene	500	340	0.0032	ND	81		>78.25
1/30/98	1,2,4-Trimethylbenzene	1500	340	0.0095	ND	81		>92.75
1/30/98	1,3-Dichlorobenzene	ND	340		ND	81		
1/30/98	1,4-Dichlorobenzene	ND	340		ND	81		
1/30/98	1,2-Dichlorobenzene	520	340	0.0040	ND	81		>79.08
1/30/98	1,2,4-Trichlorobenzene	ND	3400		ND	810		
1/30/98	Hexachlorobutadiene	ND	670		ND	160		
	Total	**107,170**		**0.7249**	**11,350**		**0.0984**	**86.42**
2/4/98	Dichlorodifluoromethane	ND	270		ND	40		
2/4/98	Chloromethane	ND	530		ND	81		
2/4/98	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	270		ND	40		
2/4/98	Vinyl chloride	ND	270		ND	40		
2/4/98	Bromomethane	ND	270		ND	40		
2/4/98	Chloroethane	ND	530		ND	81		

PTI System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

		Inlet			Outlet			
Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
2/4/98	Trichlorofluoromethane	ND	270		ND	40		
2/4/98	1,1-Dichloroethene	ND	270		ND	40		
2/4/98	Carbon disulfide	ND	1300		ND	200		
2/4/98	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	270		ND	40		
2/4/98	Acetone	ND	1300		ND	200		
2/4/98	Methylene chloride	ND	270		100	40	0.0006	
2/4/98	trans-1,2-Dichloroethene	ND	270		ND	40		
2/4/98	1,1-Dichloroethane	ND	270		ND	40		
2/4/98	Vinyl acetate	ND	1300		ND	200		
2/4/98	cis-1,2-Dichloroethene	16000	270	0.0775	1600	40	0.0105	86.41
2/4/98	2-Butanone	ND	1300		ND	200		
2/4/98	Chloroform	ND	270		180	40	0.0015	
2/4/98	1,1,1-Trichloroethane	ND	270		ND	40		
2/4/98	Carbon tetrachloride	ND	270		ND	40		
2/4/98	Benzene	ND	270		58	40	0.0003	
2/4/98	1,2-Dichloroethane	ND	270		ND	40		
2/4/98	Trichloroethene	23000	270	0.1509	3000	40	0.0267	82.28
2/4/98	1,2-Dichloropropane	ND	270		ND	40		
2/4/98	Bromodichloromethane	ND	270		ND	40		
2/4/98	cis-1,3-Dichloropropene	ND	270		ND	40		
2/4/98	4-Methyl-2-pentanone	ND	1300		ND	200		
2/4/98	Toluene	13000	270	0.0598	690	40	0.0043	92.79
2/4/98	trans-1,3-Dichloropropene	ND	270		ND	40		
2/4/98	1,1,2-Trichloroethane	ND	270		ND	40		
2/4/98	Tetrachloroethene	28000	270	0.2318	2200	40	0.0247	89.33
2/4/98	2-Hexanone	ND	4000		ND	610		
2/4/98	Dibromochloromethane	ND	270		ND	40		
2/4/98	1,2-Dibromoethane (EDB)	ND	270		ND	40		
2/4/98	Chlorobenzene	ND	270		ND	40		
2/4/98	Ethylbenzene	ND	270		ND	40		

PTI System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

		Inlet			Outlet			
Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
2/4/98	Xylenes (total)	1700	270	0.0090	ND	40		>96.80
2/4/98	Styrene	ND	270		ND	40		
2/4/98	Bromoform	ND	270		ND	40		
2/4/98	1,1,2,2-Tetrachloroethane	ND	270		ND	40		
2/4/98	Benzyl chloride	ND	1300		ND	200		
2/4/98	4-Ethyltoluene	650	270	0.0037	ND	40		>91.63
2/4/98	1,3,5-Trimethylbenzene	440	270	0.0026	ND	40		>87.64
2/4/98	1,2,4-Trimethylbenzene	1300	270	0.0078	ND	40		>95.81
2/4/98	1,3-Dichlorobenzene	ND	270		ND	40		
2/4/98	1,4-Dichlorobenzene	ND	270		ND	40		
2/4/98	1,2-Dichlorobenzene	440	270	0.0032	ND	40		>87.64
2/4/98	1,2,4-Trichlorobenzene	ND	2700		ND	400		
2/4/98	Hexachlorobutadiene	ND	530		ND	81		
	Total	**84,530**		**0.5464**	**7,828**		**0.0687**	**87.43**
2/5/98	Dichlorodifluoromethane	ND	260		ND	21		
2/5/98	Chloromethane	ND	520		ND	42		
2/5/98	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	260		ND	21		
2/5/98	Vinyl chloride	ND	260		ND	21		
2/5/98	Bromomethane	ND	260		ND	21		
2/5/98	Chloroethane	ND	520		ND	42		
2/5/98	Trichlorofluoromethane	ND	260		ND	21		
2/5/98	1,1-Dichloroethene	ND	260		ND	21		
2/5/98	Carbon disulfide	ND	1300		ND	110		
2/5/98	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	260		ND	21		
2/5/98	Acetone	ND	1300		290	110	0.0011	
2/5/98	Methylene chloride	ND	260		91	21	0.0005	
2/5/98	trans-1,2-Dichloroethene	ND	260		46	21	0.0003	
2/5/98	1,1-Dichloroethane	ND	260		ND	21		
2/5/98	Vinyl acetate	ND	1300		ND	110		

PTI System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

		Inlet			Outlet			
Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
2/5/98	cis-1,2-Dichloroethene	18000	260	0.0878	1200	21	0.0077	91.21
2/5/98	2-Butanone	ND	1300		ND	110		
2/5/98	Chloroform	ND	260		260	21	0.0021	
2/5/98	1,1,1-Trichloroethane	ND	260		ND	21		
2/5/98	Carbon tetrachloride	ND	260		ND	21		
2/5/98	Benzene	ND	260		78	21	0.0004	
2/5/98	1,2-Dichloroethane	ND	260		ND	21		
2/5/98	Trichloroethene	22000	260	0.1454	1600	21	0.0139	90.41
2/5/98	1,2-Dichloropropane	ND	260		ND	21		
2/5/98	Bromodichloromethane	ND	260		ND	21		
2/5/98	cis-1,3-Dichloropropene	ND	260		ND	21		
2/5/98	4-Methyl-2-pentanone	ND	1300		ND	110		
2/5/98	Toluene	13000	260	0.0602	530	21	0.0032	94.62
2/5/98	trans-1,3-Dichloropropene	ND	260		ND	21		
2/5/98	1,1,2-Trichloroethane	ND	260		ND	21		
2/5/98	Tetrachloroethene	29000	260	0.2419	1500	21	0.0165	93.18
2/5/98	2-Hexanone	ND	3900		ND	320		
2/5/98	Dibromochloromethane	ND	260		ND	21		
2/5/98	1,2-Dibromoethane (EDB)	ND	260		ND	21		
2/5/98	Chlorobenzene	ND	260		ND	21		
2/5/98	Ethylbenzene	290	260	0.0015	ND	21		>90.45
2/5/98	Xylenes (total)	1600	260	0.0085	ND	21		>98.26
2/5/98	Styrene	ND	260		ND	21		
2/5/98	Bromoform	ND	260		ND	21		
2/5/98	1,1,2,2-Tetrachloroethane	ND	260		ND	21		
2/5/98	Benzyl chloride	ND	1300		ND	110		
2/5/98	4-Ethyltoluene	680	260	0.0039	ND	21		>95.92
2/5/98	1,3,5-Trimethylbenzene	430	260	0.0026	ND	21		>93.56
2/5/98	1,2,4-Trimethylbenzene	1400	260	0.0085	ND	21		>98.02
2/5/98	1,3-Dichlorobenzene	ND	260		ND	21		

PTI System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

		Inlet			Outlet			
Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
2/5/98	1,4-Dichlorobenzene	ND	260		ND	21		
2/5/98	1,2-Dichlorobenzene	390	260	0.0029	ND	21		>92.89
2/5/98	1,2,4-Trichlorobenzene	ND	2600		ND	210		
2/5/98	Hexachlorobutadiene	ND	520		ND	42		
	Total	**86,790**		**0.5632**	**5,595**		**0.0458**	**91.87**
2/6/98	Dichlorodifluoromethane	ND	250		ND	14		
2/6/98	Chloromethane	ND	510		ND	28		
2/6/98	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	250		ND	14		
2/6/98	Vinyl chloride	ND	250		23	14	0.0001	
2/6/98	Bromomethane	ND	250		ND	14		
2/6/98	Chloroethane	ND	510		ND	28		
2/6/98	Trichlorofluoromethane	ND	250		ND	14		
2/6/98	1,1-Dichloroethene	ND	250		ND	14		
2/6/98	Carbon disulfide	ND	1300		ND	69		
2/6/98	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	250		ND	14		
2/6/98	Acetone	ND	1300		240	69	0.0010	
2/6/98	Methylene chloride	ND	250		84	14	0.0005	
2/6/98	trans-1,2-Dichloroethene	ND	250		38	14	0.0003	
2/6/98	1,1-Dichloroethane	ND	250		ND	14		
2/6/98	Vinyl acetate	ND	1300		ND	69		
2/6/98	cis-1,2-Dichloroethene	17000	250	0.0827	1100	14	0.0075	90.91
2/6/98	2-Butanone	ND	1300		ND	69		
2/6/98	Chloroform	ND	250		210	14	0.0018	
2/6/98	1,1,1-Trichloroethane	ND	250		ND	14		
2/6/98	Carbon tetrachloride	ND	250		ND	14		
2/6/98	Benzene	ND	250		70	14	0.0004	
2/6/98	1,2-Dichloroethane	ND	250		19	14	0.0001	
2/6/98	Trichloroethene	20000	250	0.1318	1400	14	0.0130	90.16
2/6/98	1,2-Dichloropropane	ND	250		ND	14		

PTI System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

		Inlet			Outlet			
Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
2/6/98	Bromodichloromethane	ND	250		ND	14		
2/6/98	cis-1,3-Dichloropropene	ND	250		ND	14		
2/6/98	4-Methyl-2-pentanone	ND	1300		ND	69		
2/6/98	Toluene	13000	250	0.0601	460	14	0.0030	95.03
2/6/98	trans-1,3-Dichloropropene	ND	250		ND	14		
2/6/98	1,1,2-Trichloroethane	ND	250		ND	14		
2/6/98	Tetrachloroethene	29000	250	0.2412	1300	14	0.0152	93.70
2/6/98	2-Hexanone	ND	3800		ND	210		
2/6/98	Dibromochloromethane	ND	250		ND	14		
2/6/98	1,2-Dibromoethane (EDB)	ND	250		ND	14		
2/6/98	Chlorobenzene	ND	250		ND	14		
2/6/98	Ethylbenzene	290	250	0.0015	ND	14		>93.21
2/6/98	Xylenes (total)	1800	250	0.0096	ND	14		>98.90
2/6/98	Styrene	ND	250		ND	14		
2/6/98	Bromoform	ND	250		ND	14		
2/6/98	1,1,2,2-Tetrachloroethane	ND	250		ND	14		
2/6/98	Benzyl chloride	ND	1300		ND	69		
2/6/98	4-Ethyltoluene	650	250	0.0037	ND	14		>96.97
2/6/98	1,3,5-Trimethylbenzene	450	250	0.0027	ND	14		>95.62
2/6/98	1,2,4-Trimethylbenzene	1400	250	0.0084	ND	14		>98.59
2/6/98	1,3-Dichlorobenzene	ND	250		ND	14		
2/6/98	1,4-Dichlorobenzene	ND	250		ND	14		
2/6/98	1,2-Dichlorobenzene	350	250	0.0026	ND	14		>94.37
2/6/98	1,2,4-Trichlorobenzene	ND	2500		ND	140		
2/6/98	Hexachlorobutadiene	ND	510		ND	28		
	Total	**83,940**		**0.5443**	**4,944**		**0.0428**	**92.14**

PTI System DRE (NMOC) Results Presented by Date
Steady-State Tests

Date	Inlet Concentration (ppmc)	Outlet Concentration (ppmc)	DRE (%)
1/19/98	448	121	72.99
1/22/98	395	117	70.38
1/26/98	536	121	77.43
1/30/98	394	60	84.77
2/4/98	348	38	89.14
2/5/98	333	34	89.67
2/5/98	284	24	91.65
2/6/98	284	30	89.44
Average	378	68	**83.18**

PDU System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

Summary Data					
	Inlet		Outlet		Average
Compound Name	Concentration (ppmv)	Mass Rate (lbs/hr)	Concentration (ppmv)	Mass Rate (lbs/hr)	DRE %
cis-1,2-Dichloroethene	742.86	0.0623	8.11	0.0007	98.85%
1,1,1-Trichloroethane	12.00	0.0013	0.08	0.0000	99.27%
Trichloroethene	688.57	0.0799	17.70	0.0022	97.29%
Toluene	205.86	0.0172	11.62	0.0010	94.18%
Tetrachloroethene	334.29	0.0501	11.79	0.0018	96.36%
Ethylbenzene	2.80	0.0003	0.10	0.0000	96.21%
Xylenes (total)	11.60	0.0012	0.44	0.0000	95.89%
1,2,4-Trimethylbenzene	4.50	0.0005	ND	0.0000	>92.22%
Totals	2,002.47	0.2128	49.82	0.0058	>97.27%

PDU System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

		Inlet			Outlet			
Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1/19/98	Dichlorodifluoromethane	ND	11000		ND	250		
1/19/98	Chloromethane	ND	21000		1100	510	0.0000	
1/19/98	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	11000		ND	250		
1/19/98	Vinyl chloride	ND	11000		ND	250		
1/19/98	Bromomethane	ND	11000		ND	250		
1/19/98	Chloroethane	ND	21000		ND	510		
1/19/98	Trichlorofluoromethane	ND	11000		ND	250		
1/19/98	1,1-Dichloroethene	ND	11000		ND	250		
1/19/98	Carbon disulfide	ND	53000		ND	1300		
1/19/98	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	11000		ND	250		
1/19/98	Acetone	ND	53000		6200	1300	0.0002	
1/19/98	Methylene chloride	ND	11000		7000	250	0.0004	
1/19/98	trans-1,2-Dichloroethene	ND	11000		ND	250		
1/19/98	1,1-Dichloroethane	ND	11000		ND	250		
1/19/98	Vinyl acetate	ND	53000		ND	1300		
1/19/98	cis-1,2-Dichloroethene	770000	11000	0.0465	3800	250	0.0002	99.51
1/19/98	2-Butanone	ND	53000		ND	1300		
1/19/98	Chloroform	ND	11000		25000	250	0.0019	
1/19/98	1,1,1-Trichloroethane	ND	11000		ND	250		
1/19/98	Carbon tetrachloride	ND	11000		800	250	0.0001	
1/19/98	Benzene	ND	11000		3300	250	0.0002	
1/19/98	1,2-Dichloroethane	ND	11000		3900	250	0.0002	
1/19/98	Trichloroethene	480000	11000	0.0393	1800	250	0.0001	99.63
1/19/98	1,2-Dichloropropane	ND	11000		ND	250		
1/19/98	Bromodichloromethane	ND	11000		ND	250		
1/19/98	cis-1,3-Dichloropropene	ND	11000		ND	250		
1/19/98	4-Methyl-2-pentanone	ND	53000		ND	1300		
1/19/98	Toluene	91000	11000	0.0052	250	250	0.0000	99.73
1/19/98	trans-1,3-Dichloropropene	ND	11000		ND	250		
1/19/98	1,1,2-Trichloroethane	ND	11000		ND	250		
1/19/98	Tetrachloroethene	170000	11000	0.0176	710	250	0.0001	99.58
1/19/98	2-Hexanone	ND	160000		ND	3800		
1/19/98	Dibromochloromethane	ND	11000		ND	250		
1/19/98	1,2-Dibromoethane (EDB)	ND	11000		ND	250		

PDU System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

		Inlet			Outlet			
Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1/19/98	Chlorobenzene	ND	11000		ND	250		
1/19/98	Ethylbenzene	ND	11000		ND	250		
1/19/98	Xylenes (total)	ND	11000		ND	250		
1/19/98	Styrene	ND	11000		ND	250		
1/19/98	Bromoform	ND	11000		ND	250		
1/19/98	1,1,2,2-Tetrachloroethane	ND	11000		ND	250		
1/19/98	Benzyl chloride	ND	53000		ND	1300		
1/19/98	4-Ethyltoluene	ND	11000		ND	250		
1/19/98	1,3,5-Trimethylbenzene	ND	11000		ND	250		
1/19/98	1,2,4-Trimethylbenzene	ND	11000		ND	250		
1/19/98	1,3-Dichlorobenzene	ND	11000		ND	250		
1/19/98	1,4-Dichlorobenzene	ND	11000		ND	250		
1/19/98	1,2-Dichlorobenzene	ND	11000		ND	250		
1/19/98	1,2,4-Trichlorobenzene	ND	110000		ND	2500		
1/19/98	Hexachlorobutadiene	ND	21000		ND	510		
	Total	**1,511,000**		**0.1086**	**53,860**		**0.0034**	**96.84**
1/22/98	Dichlorodifluoromethane	ND	4700		ND	420		
1/22/98	Chloromethane	ND	9400		2000	840	0.0001	
1/22/98	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	4700		ND	420		
1/22/98	Vinyl chloride	ND	4700		ND	420		
1/22/98	Bromomethane	ND	4700		ND	420		
1/22/98	Chloroethane	ND	9400		ND	840		
1/22/98	Trichlorofluoromethane	ND	4700		ND	420		
1/22/98	1,1-Dichloroethene	ND	4700		ND	420		
1/22/98	Carbon disulfide	ND	24000		ND	2100		
1/22/98	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	4700		ND	420		
1/22/98	Acetone	ND	24000		15000	2100	0.0008	
1/22/98	Methylene chloride	5200	4700	0.0004	9500	420	0.0008	-82.69
1/22/98	trans-1,2-Dichloroethene	5800	4700	0.0005	460	420	0.0000	92.07
1/22/98	1,1-Dichloroethane	ND	4700		ND	420		
1/22/98	Vinyl acetate	ND	24000		ND	2100		
1/22/98	cis-1,2-Dichloroethene	860000	4700	0.0779	5000	420	0.0005	99.42
1/22/98	2-Butanone	ND	24000		ND	2100		

PDU System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

		Inlet			Outlet			
Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1/22/98	Chloroform	10000	4700	0.0011	33000	420	0.0037	-230.00
1/22/98	1,1,1-Trichloroethane	ND	4700		ND	420		
1/22/98	Carbon tetrachloride	ND	4700		930	420	0.0001	
1/22/98	Benzene	ND	4700		7100	420	0.0005	
1/22/98	1,2-Dichloroethane	ND	4700		4400	420	0.0004	
1/22/98	Trichloroethene	770000	4700	0.0945	4800	420	0.0006	99.38
1/22/98	1,2-Dichloropropane	ND	4700		500	420	0.0001	
1/22/98	Bromodichloromethane	ND	4700		ND	420		
1/22/98	cis-1,3-Dichloropropene	ND	4700		ND	420		
1/22/98	4-Methyl-2-pentanone	ND	24000		ND	2100		
1/22/98	Toluene	200000	4700	0.0172	1500	420	0.0001	99.25
1/22/98	trans-1,3-Dichloropropene	ND	4700		ND	420		
1/22/98	1,1,2-Trichloroethane	ND	4700		ND	420		
1/22/98	Tetrachloroethene	330000	4700	0.0511	3800	420	0.0006	98.85
1/22/98	2-Hexanone	ND	71000		ND	6300		
1/22/98	Dibromochloromethane	ND	4700		ND	420		
1/22/98	1,2-Dibromoethane (EDB)	ND	4700		ND	420		
1/22/98	Chlorobenzene	ND	4700		ND	420		
1/22/98	Ethylbenzene	ND	4700		ND	420		
1/22/98	Xylenes (total)	7200	4700	0.0007	ND	420		>94.16
1/22/98	Styrene	ND	4700		ND	420		
1/22/98	Bromoform	ND	4700		ND	420		
1/22/98	1,1,2,2-Tetrachloroethane	ND	4700		ND	420		
1/22/98	Benzyl chloride	ND	24000		ND	2100		
1/22/98	4-Ethyltoluene	ND	4700		ND	420		
1/22/98	1,3,5-Trimethylbenzene	ND	4700		ND	420		
1/22/98	1,2,4-Trimethylbenzene	ND	4700		ND	420		
1/22/98	1,3-Dichlorobenzene	ND	4700		ND	420		
1/22/98	1,4-Dichlorobenzene	ND	4700		ND	420		
1/22/98	1,2-Dichlorobenzene	ND	4700		ND	420		
1/22/98	1,2,4-Trichlorobenzene	ND	47000		ND	4200		
1/22/98	Hexachlorobutadiene	ND	9400		ND	840		
	Total	**2,188,200**		**0.2436**	**87,990**		**0.0083**	**>96.61**

PDU System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

		Inlet			Outlet			
Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1/26/98	Dichlorodifluoromethane	ND	12000		No sample - bad pressure regulator on summa canist			
1/26/98	Chloromethane	ND	24000					
1/26/98	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	12000					
1/26/98	Vinyl chloride	ND	12000					
1/26/98	Bromomethane	ND	12000					
1/26/98	Chloroethane	ND	24000					
1/26/98	Trichlorofluoromethane	ND	12000					
1/26/98	1,1-Dichloroethene	ND	12000					
1/26/98	Carbon disulfide	ND	59000					
1/26/98	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	12000					
1/26/98	Acetone	ND	59000					
1/26/98	Methylene chloride	14000	12000	0.0010				
1/26/98	trans-1,2-Dichloroethene	ND	12000					
1/26/98	1,1-Dichloroethane	ND	12000					
1/26/98	Vinyl acetate	ND	59000					
1/26/98	cis-1,2-Dichloroethene	1300000	12000	0.1031				
1/26/98	2-Butanone	ND	59000					
1/26/98	Chloroform	ND	12000					
1/26/98	1,1,1-Trichloroethane	12000	12000	0.0013				
1/26/98	Carbon tetrachloride	ND	12000					
1/26/98	Benzene	ND	12000					
1/26/98	1,2-Dichloroethane	ND	12000					
1/26/98	Trichloroethene	1100000	12000	0.1182				
1/26/98	1,2-Dichloropropane	ND	12000					
1/26/98	Bromodichloromethane	ND	12000					
1/26/98	cis-1,3-Dichloropropene	ND	12000					
1/26/98	4-Methyl-2-pentanone	ND	59000					
1/26/98	Toluene	210000	12000	0.0158				
1/26/98	trans-1,3-Dichloropropene	ND	12000					
1/26/98	1,1,2-Trichloroethane	ND	12000					
1/26/98	Tetrachloroethene	370000	12000	0.0502				
1/26/98	2-Hexanone	ND	180000					
1/26/98	Dibromochloromethane	ND	12000					
1/26/98	1,2-Dibromoethane (EDB)	ND	12000					

PDU System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

		Inlet			Outlet			
Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1/26/98	Chlorobenzene	ND	12000					
1/26/98	Ethylbenzene	ND	12000					
1/26/98	Xylenes (total)	ND	12000					
1/26/98	Styrene	ND	12000					
1/26/98	Bromoform	ND	12000					
1/26/98	1,1,2,2-Tetrachloroethane	ND	12000					
1/26/98	Benzyl chloride	ND	59000					
1/26/98	4-Ethyltoluene	ND	12000					
1/26/98	1,3,5-Trimethylbenzene	ND	12000					
1/26/98	1,2,4-Trimethylbenzene	ND	12000					
1/26/98	1,3-Dichlorobenzene	ND	12000					
1/26/98	1,4-Dichlorobenzene	ND	12000					
1/26/98	1,2-Dichlorobenzene	ND	12000					
1/26/98	1,2,4-Trichlorobenzene	ND	120000					
1/26/98	Hexachlorobutadiene	ND	24000					
	Total	**3,006,000**		**0.2895**				
1/30/98	Dichlorodifluoromethane	ND	9700		ND	58		
1/30/98	Chloromethane	ND	19000		1000	120	0.0000	
1/30/98	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	9700		ND	58		
1/30/98	Vinyl chloride	ND	9700		ND	58		
1/30/98	Bromomethane	ND	9700		ND	58		
1/30/98	Chloroethane	ND	19000		170	120	0.0000	
1/30/98	Trichlorofluoromethane	ND	9700		ND	58		
1/30/98	1,1-Dichloroethene	ND	9700		ND	58		
1/30/98	Carbon disulfide	ND	49000		ND	290		
1/30/98	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	9700		ND	58		
1/30/98	Acetone	ND	49000		12000	290	0.0007	
1/30/98	Methylene chloride	12000	9700	0.0010	7200	58	0.0006	40.00
1/30/98	trans-1,2-Dichloroethene	ND	9700		190	58	0.0000	
1/30/98	1,1-Dichloroethane	ND	9700		77	58	0.0000	
1/30/98	Vinyl acetate	ND	49000		ND	290		
1/30/98	cis-1,2-Dichloroethene	690000	9700	0.0625	240	58	0.0000	99.97
1/30/98	2-Butanone	ND	49000		ND	290		

PDU System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

		Inlet			Outlet			
Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
1/30/98	Chloroform	ND	9700		280000	380	0.0312	
1/30/98	1,1,1-Trichloroethane	ND	9700		77	58	0.0000	
1/30/98	Carbon tetrachloride	ND	9700		1300	58	0.0002	
1/30/98	Benzene	ND	9700		6000	58	0.0004	
1/30/98	1,2-Dichloroethane	ND	9700		2700	58	0.0002	
1/30/98	Trichloroethene	720000	9700	0.0884	1100	58	0.0001	99.85
1/30/98	1,2-Dichloropropane	ND	9700		280	58	0.0000	
1/30/98	Bromodichloromethane	ND	9700		ND	58		
1/30/98	cis-1,3-Dichloropropene	ND	9700		ND	58		
1/30/98	4-Methyl-2-pentanone	ND	49000		ND	290		
1/30/98	Toluene	200000	9700	0.0172	650	58	0.0001	99.68
1/30/98	trans-1,3-Dichloropropene	ND	9700		ND	58		
1/30/98	1,1,2-Trichloroethane	ND	9700		ND	58		
1/30/98	Tetrachloroethene	310000	9700	0.0480	2300	58	0.0004	99.26
1/30/98	2-Hexanone	ND	150000		ND	870		
1/30/98	Dibromochloromethane	ND	9700		ND	58		
1/30/98	1,2-Dibromoethane (EDB)	ND	9700		ND	58		
1/30/98	Chlorobenzene	ND	9700		ND	58		
1/30/98	Ethylbenzene	ND	9700		ND	58		
1/30/98	Xylenes (total)	ND	9700		ND	58		
1/30/98	Styrene	ND	9700		ND	58		
1/30/98	Bromoform	ND	9700		ND	58		
1/30/98	1,1,2,2-Tetrachloroethane	ND	9700		ND	58		
1/30/98	Benzyl chloride	ND	49000		ND	290		
1/30/98	4-Ethyltoluene	ND	9700		ND	58		
1/30/98	1,3,5-Trimethylbenzene	ND	9700		ND	58		
1/30/98	1,2,4-Trimethylbenzene	ND	9700		ND	58		
1/30/98	1,3-Dichlorobenzene	ND	9700		ND	58		
1/30/98	1,4-Dichlorobenzene	ND	9700		ND	58		
1/30/98	1,2-Dichlorobenzene	ND	9700		ND	58		
1/30/98	1,2,4-Trichlorobenzene	ND	97000		ND	580		
1/30/98	Hexachlorobutadiene	ND	19000		ND	120		
	Total	**1,932,000**		**0.2171**	**315,284**		**0.0340**	**84.33**

PDU System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

		Inlet			Outlet			
Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
2/4/98	Dichlorodifluoromethane	ND	13000		ND	530		
2/4/98	Chloromethane	ND	27000		ND	1100		
2/4/98	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	13000		ND	530		
2/4/98	Vinyl chloride	ND	13000		ND	530		
2/4/98	Bromomethane	ND	13000		ND	530		
2/4/98	Chloroethane	ND	27000		ND	1100		
2/4/98	Trichlorofluoromethane	ND	13000		ND	530		
2/4/98	1,1-Dichloroethene	ND	13000		ND	530		
2/4/98	Carbon disulfide	ND	67000		ND	2700		
2/4/98	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	13000		ND	530		
2/4/98	Acetone	ND	67000		28000	2700	0.0015	
2/4/98	Methylene chloride	ND	13000		8300	530	0.0007	
2/4/98	trans-1,2-Dichloroethene	ND	13000		6200	530	0.0006	
2/4/98	1,1-Dichloroethane	ND	13000		ND	530		
2/4/98	Vinyl acetate	ND	67000		ND	2700		
2/4/98	cis-1,2-Dichloroethene	580000	13000	0.0522	15000	530	0.0013	97.41
2/4/98	2-Butanone	ND	67000		ND	2700		
2/4/98	Chloroform	ND	13000		28000	530	0.0031	
2/4/98	1,1,1-Trichloroethane	ND	13000		ND	530		
2/4/98	Carbon tetrachloride	ND	13000		ND	530		
2/4/98	Benzene	ND	13000		12000	530	0.0009	
2/4/98	1,2-Dichloroethane	ND	13000		3500	530	0.0003	
2/4/98	Trichloroethene	700000	13000	0.0853	43000	530	0.0052	93.86
2/4/98	1,2-Dichloropropane	ND	13000		640	530	0.0001	
2/4/98	Bromodichloromethane	ND	13000		ND	530		
2/4/98	cis-1,3-Dichloropropene	ND	13000		ND	530		
2/4/98	4-Methyl-2-pentanone	ND	67000		ND	2700		
2/4/98	Toluene	250000	13000	0.0214	26000	530	0.0022	89.60
2/4/98	trans-1,3-Dichloropropene	ND	13000		ND	530		
2/4/98	1,1,2-Trichloroethane	ND	13000		ND	530		
2/4/98	Tetrachloroethene	390000	13000	0.0600	31000	530	0.0048	92.05
2/4/98	2-Hexanone	ND	200000		ND	8000		
2/4/98	Dibromochloromethane	ND	13000		ND	530		
2/4/98	1,2-Dibromoethane (EDB)	ND	13000		ND	530		

PDU System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

Date	Compound Name	Inlet			Outlet			DRE (%)
		Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	
2/4/98	Chlorobenzene	ND	13000		ND	530		
2/4/98	Ethylbenzene	ND	13000		ND	530		
2/4/98	Xylenes (total)	ND	13000		ND	530		
2/4/98	Styrene	ND	13000		ND	530		
2/4/98	Bromoform	ND	13000		ND	530		
2/4/98	1,1,2,2-Tetrachloroethane	ND	13000		ND	530		
2/4/98	Benzyl chloride	ND	67000		ND	2700		
2/4/98	4-Ethyltoluene	ND	13000		ND	530		
2/4/98	1,3,5-Trimethylbenzene	ND	13000		ND	530		
2/4/98	1,2,4-Trimethylbenzene	ND	13000		ND	530		
2/4/98	1,3-Dichlorobenzene	ND	13000		ND	530		
2/4/98	1,4-Dichlorobenzene	ND	13000		ND	530		
2/4/98	1,2-Dichlorobenzene	ND	13000		ND	530		
2/4/98	1,2,4-Trichlorobenzene	ND	130000		ND	5300		
2/4/98	Hexachlorobutadiene	ND	27000		ND	1100		
	Total	**1,920,000**		**0.2189**	**201,640**		**0.0207**	**90.56**
2/5/98	Dichlorodifluoromethane	ND	10000		ND	46		
2/5/98	Chloromethane	ND	21000		380	92	0.0000	
2/5/98	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	10000		ND	46		
2/5/98	Vinyl chloride	ND	10000		ND	46		
2/5/98	Bromomethane	ND	10000		ND	46		
2/5/98	Chloroethane	ND	21000		150	92	0.0000	
2/5/98	Trichlorofluoromethane	ND	10000		ND	46		
2/5/98	1,1-Dichloroethene	ND	10000		ND	46		
2/5/98	Carbon disulfide	ND	52000		ND	230		
2/5/98	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	10000		ND	46		
2/5/98	Acetone	ND	52000		33000	2300	0.0019	
2/5/98	Methylene chloride	11000	10000	0.0009	1200	46	0.0001	89.09
2/5/98	trans-1,2-Dichloroethene	ND	10000		930	46	0.0001	
2/5/98	1,1-Dichloroethane	ND	10000		ND	46		
2/5/98	Vinyl acetate	ND	52000		ND	230		
2/5/98	cis-1,2-Dichloroethene	410000	10000	0.0403	2600	46	0.0003	99.37
2/5/98	2-Butanone	ND	52000		1800	230	0.0001	

PDU System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

		Inlet			Outlet			
Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
2/5/98	Chloroform	13000	10000	0.0016	5100	46	0.0006	60.77
2/5/98	1,1,1-Trichloroethane	ND	10000		ND	46		
2/5/98	Carbon tetrachloride	ND	10000		ND	46		
2/5/98	Benzene	ND	10000		2100	46	0.0002	
2/5/98	1,2-Dichloroethane	ND	10000		460	46	0.0000	
2/5/98	Trichloroethene	460000	10000	0.0612	6500	46	0.0009	98.59
2/5/98	1,2-Dichloropropane	ND	10000		94	46	0.0000	
2/5/98	Bromodichloromethane	ND	10000		ND	46		
2/5/98	cis-1,3-Dichloropropene	ND	10000		ND	46		
2/5/98	4-Methyl-2-pentanone	ND	52000		ND	230		
2/5/98	Toluene	210000	10000	0.0196	5300	46	0.0005	97.48
2/5/98	trans-1,3-Dichloropropene	ND	10000		ND	46		
2/5/98	1,1,2-Trichloroethane	ND	10000		ND	46		
2/5/98	Tetrachloroethene	360000	10000	0.0604	3900	46	0.0007	98.92
2/5/98	2-Hexanone	ND	150000		ND	690		
2/5/98	Dibromochloromethane	ND	10000		ND	46		
2/5/98	1,2-Dibromoethane (EDB)	ND	10000		ND	46		
2/5/98	Chlorobenzene	ND	10000		ND	46		
2/5/98	Ethylbenzene	ND	10000		98	46	0.0000	
2/5/98	Xylenes (total)	ND	10000		440	46	0.0000	
2/5/98	Styrene	ND	10000		100	46	0.0000	
2/5/98	Bromoform	ND	10000		ND	46		
2/5/98	1,1,2,2-Tetrachloroethane	ND	10000		ND	46		
2/5/98	Benzyl chloride	ND	52000		ND	230		
2/5/98	4-Ethyltoluene	ND	10000		75	46	0.0000	
2/5/98	1,3,5-Trimethylbenzene	ND	10000		ND	46		
2/5/98	1,2,4-Trimethylbenzene	ND	10000		ND	46		
2/5/98	1,3-Dichlorobenzene	ND	10000		ND	46		
2/5/98	1,4-Dichlorobenzene	ND	10000		270	46	0.0000	
2/5/98	1,2-Dichlorobenzene	ND	10000		230	46	0.0000	
2/5/98	1,2,4-Trichlorobenzene	ND	100000		ND	460		
2/5/98	Hexachlorobutadiene	ND	21000		ND	92		
	Total	**1,464,000**		**0.1839**	**64,727**		**0.0056**	**96.98**

PDU System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

		Inlet			Outlet			
Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
2/6/98	Dichlorodifluoromethane	ND	2100		ND	350		
2/6/98	Chloromethane	ND	4100		1100	690	0.0001	
2/6/98	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	2100		ND	350		
2/6/98	Vinyl chloride	ND	2100		ND	350		
2/6/98	Bromomethane	ND	2100		ND	350		
2/6/98	Chloroethane	ND	4100		ND	690		
2/6/98	Trichlorofluoromethane	ND	2100		ND	350		
2/6/98	1,1-Dichloroethene	ND	2100		ND	350		
2/6/98	Carbon disulfide	ND	10000		ND	1700		
2/6/98	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	2100		ND	350		
2/6/98	Acetone	23000	10000	0.0012	45000	1700	0.0024	-95.65
2/6/98	Methylene chloride	6600	2100	0.0005	9200	350	0.0007	-39.39
2/6/98	trans-1,2-Dichloroethene	9300	2100	0.0008	8000	350	0.0007	13.98
2/6/98	1,1-Dichloroethane	ND	2100		ND	350		
2/6/98	Vinyl acetate	ND	10000		ND	1700		
2/6/98	cis-1,2-Dichloroethene	590000	10000	0.0535	22000	350	0.0020	96.27
2/6/98	2-Butanone	ND	10000		3500	1700	0.0002	
2/6/98	Chloroform	18000	2100	0.0020	31000	350	0.0035	-72.22
2/6/98	1,1,1-Trichloroethane	ND	2100		ND	350		
2/6/98	Carbon tetrachloride	ND	2100		ND	350		
2/6/98	Benzene	8900	2100	0.0006	13000	350	0.0009	-46.07
2/6/98	1,2-Dichloroethane	4500	2100	0.0004	3000	350	0.0003	33.33
2/6/98	Trichloroethene	590000	10000	0.0724	49000	350	0.0060	91.69
2/6/98	1,2-Dichloropropane	ND	2100		550	350	0.0001	
2/6/98	Bromodichloromethane	ND	2100		ND	350		
2/6/98	cis-1,3-Dichloropropene	ND	2100		ND	350		
2/6/98	4-Methyl-2-pentanone	ND	10000		ND	1700		
2/6/98	Toluene	280000	2100	0.0241	36000	350	0.0031	87.14
2/6/98	trans-1,3-Dichloropropene	ND	2100		ND	350		
2/6/98	1,1,2-Trichloroethane	ND	2100		ND	350		
2/6/98	Tetrachloroethene	410000	2100	0.0635	29000	350	0.0045	92.93
2/6/98	2-Hexanone	ND	31000		ND	5200		
2/6/98	Dibromochloromethane	ND	2100		ND	350		
2/6/98	1,2-Dibromoethane (EDB)	ND	2100		ND	350		

PDU System DRE (Method TO-14) Results Presented by Sample
Steady-State Tests

		Inlet			Outlet			
Date	Compound Name	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	Concentration (ppbv)	Reporting Limit (ppbv)	Mass Rate (lbs/hr)	DRE (%)
2/6/98	Chlorobenzene	ND	2100		ND	350		
2/6/98	Ethylbenzene	2800	2100	0.0003	ND	350		>87.50
2/6/98	Xylenes (total)	16000	2100	0.0016	ND	350		>97.81
2/6/98	Styrene	ND	2100		ND	350		
2/6/98	Bromoform	ND	2100		ND	350		
2/6/98	1,1,2,2-Tetrachloroethane	ND	2100		ND	350		
2/6/98	Benzyl chloride	ND	10000		ND	1700		
2/6/98	4-Ethyltoluene	ND	2100		ND	350		
2/6/98	1,3,5-Trimethylbenzene	ND	2100		ND	350		
2/6/98	1,2,4-Trimethylbenzene	4500	2100	0.0005	ND	350		>92.22
2/6/98	1,3-Dichlorobenzene	ND	2100		ND	350		
2/6/98	1,4-Dichlorobenzene	ND	2100		ND	350		
2/6/98	1,2-Dichlorobenzene	ND	2100		ND	350		
2/6/98	1,2,4-Trichlorobenzene	ND	21000		ND	3500		
2/6/98	Hexachlorobutadiene	ND	4100		ND	690		
	Total	**1,963,600**		**0.2216**	**250,350**		**0.0245**	**>88.93**

PDU DRE (NMOC) Results Presented by Date
Steady-State Tests

Date	Inlet Concentration (ppmc)	Outlet Concentration (ppmc)	DRE (%)
1/19/98	8,989	69	99.23
1/22/98	7,361	145	98.03
1/26/98	10,995	NA	NA
1/30/98	6,084	110	98.19
2/4/98	10,204	679	93.35
2/5/98	10,623	108	98.98
2/6/98	9,941	830	91.65
Average	9,171	324	**96.57**

APPENDIX D
SUMMARY OF SVOC AND PCB RESULTS

Contents:

Engineering Source Test Report Summary

SCEC

ENGINEERING SOURCE TEST REPORT

PROCESS TECHNOLOGIES, INC.
1160 Exchange Street
Boise, Idaho 83716-5762

EQUIPMENT LOCATION:

Naval Air Station, North Island
San Diego, California

TEST DATE:

October 27, 1997

ISSUE DATE:

January 13, 1998

PARAMETERS MEASURED:

Emissions of PCB/Pesticides and PAHs

TESTED BY:

SCEC
1582-1 N. Batavia
Orange, CA 92867

Report No: **29822.0001**

Tested By: N P Conron

Reviewed By:

1.0 - Executive Summary

Process Technology, Inc. (PTI) retained SCEC to measure PCB/Pesticides/PAH emissions at the inlet and outlet of the PTI scrubber located at the NAS North Island, San Diego, CA. The scrubber was operated at normal conditions during the test. Only three of the ninety-two compounds tested showed results above the laboratory detection limit; one semivolatile organic compound in the inlet sample and two semivolatile organic compounds in the outlet sample.

The source test was performed on October 27, 1997. The concentration results for the detectable semivolatile organics are listed below in Table 1.0 and were collected in a 2-hour sample time. All other compounds tested were reported as non-detect (ND). For these compounds, the concentration values listed in Table 3.0 through 3.2 are based on one-half the laboratory detection limit.

TABLE 1.0
Detectable Semivolatile Organics

Semivolatile Organic Compound	Sample Description	Concentration (ppbv)
bis (2-Ethylhexyl) phthalate	Inlet	7.8
2-Methylnaphthalene	Outlet	24.8
Acenaphthene	Outlet	1.9

29822b.rpt

2.0 - Introduction

The following test methods were used:

TABLE 2.0
Sampling Methodology

Parameter	Sampling Method
PCBs/Pesticides/PAHs	CARB Method 429
Moisture	CARB Method 4.1
Volume Flow Rate	CARB Method 1.1 to 2.1

Each extract developed at the laboratory was split in half. One half was tested for PCB/Pesticides by EPA Method 8080 and the other for semivolatile organics by EPA Method 8270.

All raw data was reduced and used to calculate the final results listed in Section 4. The calculations were performed using computer programs that have undergone quality control inspections before usage. The detailed results (computer generated spreadsheet data) are provided in Appendix A. Laboratory results and quality assurance documentation are provided in Appendix B and C, respectively.

The test methodology is discussed in Section 6.0.

The testing was performed by Mr. Neal P. Conroy - Project Scientist from SCEC and Mr. Robert Leyva - Technician from SCEC.

3.0 - Summary of Results

The test results are summarized in Table 3.0 through 3.2.

3.0 Summary of Results (Continued)

TABLE 3.0

PCB/Pesticides

Test Results Summary

PTI Scrubber

Naval Air Station, North Island, San Deigo, CA

10/27/97
SCEC Project No.: 29822

COMPOUND	INLET Concentration (ppbv)	OUTLET Concentration (ppbv)
1) alpha - BHC	1.05E-03	7.40E-04
2) beta - BHC	4.19E-03	2.96E-03
3) delta- BHC	4.19E-03	2.96E-03
4) gamma - BHC (Lindane)	4.19E-03	2.96E-03
5) Heptachloro	3.27E-03	2.31E-03
6) Aldrin	3.34E-03	2.36E-03
7) Heptachlor epoxide	3.05E-03	2.16E-03
8) gamma - Chlordane	2.98E-03	2.10E-03
9) alpha - Chlordane	2.98E-03	2.10E-03
10) Endosulfan I	3.00E-03	2.12E-03
11) Dieldrin	6.40E-03	4.52E-03
12) 4,4' - DDE	7.67E-03	5.41E-03
13) Endrin	6.40E-03	4.52E-03
14) Endosulfan II	5.99E-03	4.23E-03
15) 4,4' - DDD	7.62E-03	5.38E-03
16) 4,4' - DDT	6.88E-03	4.86E-03
17) Endosulfan sulfate	5.77E-03	4.07E-03
18) Endrin ketone	6.40E-03	4.52E-03
19) Methoxychloro	3.53E-02	2.49E-02
20) Toxaphene	2.95E-02	2.08E-02
21) Aroclor 1016	8.41E-02	5.94E-02
22) Aroclor 1221	4.20E-02	2.97E-02
23) Aroclor 1232	4.20E-02	2.97E-02
24) Aroclor 1242	4.20E-02	2.97E-02
25) Aroclor 1248	4.20E-02	2.97E-02
26) Aroclor 1254	8.41E-02	5.94E-02
27) Aroclor 1260	8.41E-02	5.94E-02

NOTE: All lab result were ND and reported ppbv values are based on half of the detection limit.

TABLE 3.1

Semivolatile Organics

Test Results Summary

PTI Scrubber

Naval Air Station, North Island, San Deigo, CA

10/27/97

SCEC Project No.: 29822

COMPOUND	INLET Concentration (ppbv)	OUTLET Concentration (ppbv)
1) Phenol	1.94	1.37
2) bis (2 - Chloroethyl) ether	1.28	0.90
3) 2 - Chlorophenol	1.42	1.00
4) 1,3 - Dichlorobenzene	1.24	0.88
5) 1,4 - Dichlorobenzene	1.24	0.88
6) Benzyl alcohol	1.69	1.19
7) 1,2 - Dichlorobenzene	1.24	0.88
8) 2 - Methylphenol	1.69	1.19
9) bis (2 - Chloroisopropyl) ether	1.07	0.75
10) 4 - Methylphenol	1.69	1.19
11) n - Nitroso - di - n - propylamine	1.40	0.99
12) Hexachloroethane	0.77	0.55
13) Nitrobenzene	1.49	1.05
14) Isophorone	1.32	0.93
15) 2 - Nitrophenol	1.31	0.93
16) 2,4 - Dimethylphenol	1.50	1.06
17) Benzoic acid	7.49	5.29
18) bis (2 - Chloroethoxy) methane	1.06	0.75
19) 2,4 - Dichlorophenol	1.12	0.79
20) 1,2,4 - Trichlorobenzene	1.01	0.71
21) Naphthalene	1.43	1.01
22) 4 -Chloroaniline	1.43	1.01
23) Hexachlorobutadiene	0.70	0.50
24) 4 - Chloro - 3 - methylphenol	1.28	0.91
25) 2 - Methylnaphthalene	1.29	24.82 *
26) Hexachlorocyclopentadiene	0.67	0.47
27) 2,4,6 - Trichlorophenol	0.93	0.65
28) 2,4,5 - Trichlorophenol	4.63	3.27
29) 2 - Chloronaphthanlene	1.12	0.79
30) 2 - Nitroaniline	1.32	0.93
31) Dimethyl phthalate	0.94	0.66
32) Acenaphthylene	1.20	0.85
33) 3 - Nitroaniline	6.62	4.67

* Lab result above detection limit (DL); all other results were ND and reported ppbv values are based on half of the DL.

3.0 Summary of Results (Continued)

TABLE 3.2

Semivolatile Organics (Continued)

Test Results Summary

PTI Scrubber

Naval Air Station, North Island, San Deigo, CA

10/27/97

SCEC Project No.: 29822

COMPOUND	INLET Concentration (ppbv)	OUTLET Concentration (ppbv)
34) Acenaphthene	1.19	1.90 *
35) 2,4 - Dinitrophenol	4.97	3.51
36) 4 - Nitrophenol	6.57	4.64
37) Dibenzofuran	1.09	0.77
38) 2,4 - Dinitrotoluene	1.00	0.71
39) 2,6 - Dinitrotoluene	1.00	0.71
40) Diethyl phthalate	0.82	0.58
41) 4 - Chlorophenyl phenyl ether	0.89	0.63
42) Fluorene	1.10	0.78
43) 4 - Nitroaniline	6.62	4.67
44) 4,6 - Dinitro - 2 - methylphenol	4.62	3.26
45) N - Nitrosodiphenylamine	0.92	0.65
46) 4 - Bromophenyl phenyl ether	0.73	0.52
47) Hexachlorobenzene	0.64	0.45
48) Pentachlorophenol	3.43	2.42
49) Phenanthrene	1.03	0.72
50) Anthracene	1.03	0.72
51) Di - n - butyl phthalate	0.66	0.46
52) Fluoranthene	0.90	0.64
53) Pyrene	0.90	0.64
54) Butyl benzyl phthalate	0.59	0.41
55) 3,3' - Dichlorobenzidine	1.44	1.02
56) Benzo(a)anthracene	0.80	0.57
57) bis (2 - Ethylhexyl) phthalate	7.80 *	0.33
58) Chrysene	0.80	0.57
59) Di - n - octyl phthalate	0.47	0.33
60) Benzo(b)fluoranthene	0.72	0.51
61) Benzo(k)fluoranthene	0.72	0.51
62) Benzo(a)pyrene	0.72	0.51
63) Indeno (1,2,3 - c,d) pyrene	0.66	0.47
64) Dibenzo (a,h) anthracene	0.66	0.46
65) Benzo(g,h,i) perylene	0.66	0.47

* Lab result above detection limit (DL); all other results were ND and reported ppbv values are based on half of the DL.

4.0 - Discussion of Results

Due to the small diameter (6 inches) of the sampling ducts the samples were collected at a fixed-point halfway into the sampling duct.

5.0 - Sampling and Analytical Procedures

5.1 - CARB Method 429 - Sampling Method for PCB/Pesticides and PAHs

INTRODUCTION

The Method 429 sampling train was used to sample gaseous and particulate phase pollutants. The laboratory extract was split to analyze for PCB/Pesticides by EPA Method 8080 and for PAHs by EPA Method 8270.

SAMPLE PREPARATION

Nozzle, probe, filter holder, and impingers were rinsed with Distilled/Deionized water and hexane. 100ml of Distilled/Deionized water was placed in the first impinger, the second impinger was left empty, and the third impinger was filled with approximately 400 grams of Silica gel. The filter holder was charged with a teflon fiber filter.

SAMPLING PROCEDURE

The apparatus consisted of a teflon nozzle, teflon probe, filter holder, condenser, and XAD-2 resin trap, followed by the impingers connected in tandem and immersed in an ice bath. In addition, both the condenser and the XAD-2 resin trap were enclosed within a circulating cold water blanket. The absorption train was followed by a vacuum pump, dry gas meter, and a calibrated restriction orifice fitted with a manometer and a sample gas bladder.

Due to the small diameter (6 inches) of the sampling ducts the samples were collected at a fixed-point halfway into the sampling duct. The apparatus was leak tested and the nozzle was positioned prior to sampling.

Duct conditions were monitored at the sampling point with a type "S" pitot tube and a type "K" thermocouple. Conditions at the sampling apparatus and metering device were constantly monitored and regularly recorded on the data sheet.

On completion of the sampling, the apparatus was removed from the stack, leak checked, and transported to the mobile laboratory.

5.0 - Sampling and Analytical Procedures

5.1 - CARB Method 429 - Sampling Method for PCB/Pesticides and PAHs (Continued)

SAMPLE RECOVERY

Container No.	Item	Rinsing Solution	Quantity
1	Sample Resin Trap	N/A	N/A
2	Sample Filter	N/A	N/A
3	Sample Front Half	Hexane	100 ml
4	Field Blank Resin Trap	N/A	N/A
5	Field Blank Filter	N/A	N/A
6	Field Blank Reagent	Hexane	100 ml

SAMPLE ANALYSIS

The filter was removed and recovered. The front half sample was recovered from the nozzle, probe, and filter housing with hexane. The XAD-2 resin trap was sealed from contamination and forwarded to the appropriate analytical Laboratory for analysis. During sample holding time all samples were maintained between 0-4°C.

EQUATIONS

Sample Gas Flow

$$Vmstd = V_m Y \frac{(T_{std})}{T_m} \frac{(P_{bar} + dH/13.6)}{P_{std}}$$

Pollutant Concentrations

$$ppmv = \frac{[ug/sample][g/10^6\ ug][0.849\ cf/gmole][1/MW(g/gmole)]}{Exh.\ Gas\ Volume\ (cf)} \cdot 10^6$$

5.0 - Sampling and Analytical Procedures

5.1 - CARB Method 429 - Sampling Method for PCB/Pesticides and PAHs (Continued)

NOMENCLATURE		SYMBOL IDENTIFICATION
An	=	Cross-sectional area of nozzle (ft^2)
Delta H	=	Average pressure differential across the orifice meter, (in H_2O)
Gs	=	Total mass of PAH's in stack gas sample, (ng)
%I	=	Isokinetic Rate
K5	=	Applicable conversion factor
Mn	=	Total weight of pollutant collected, mg
Pbar	=	Barometric pressure at measurement site, (in Hg)
Ps	=	Absolute stack gas pressure, (in Hg)
Theta	=	Total sampling time (min)
Tm	=	Absolute temperature at meter, (°R)
Tstd	=	Standard absolute temperature, (528°R)
Vlc	=	Volume of water condensed in impingers and silica gel, (ml)
Vm	=	Dry gas volume measured by dry gas meter, (dcf)
Vmstd	=	Dry gas volume measured by dry gas meter, corrected to standard conditions, (dscf)
Vs	=	Average stack gas velocity, (ft/sec)
Y	=	Dry gas meter calibration factor

APPENDIX E
GASEOUS RESIDUE ANALYSIS RESULTS

Contents:

Test Results Summary for HCl, Chlorine & Phosgene

SCEC

ENGINEERING SOURCE TEST REPORT

PROCESS TECHNOLOGIES, INC.
1160 Exchange Street
Boise, Idaho 83716-5762

EQUIPMENT LOCATION:

Naval Air Station, North Island
San Diego, California

TEST DATE:

February 2, 1998

ISSUE DATE:

March 24, 1998

PARAMETERS MEASURED:

Emissions of Phosgene, Chlorine, and Hydrochloric Acid

TESTED BY:

SCEC
1582-1 N. Batavia
Orange, CA 92867

Report No: **29822.0002**

Tested By: ____________

Reviewed By: ____________

1.0 Executive Summary

Process Technology, Inc. (PTI) retained SCEC to measure Phosgene, Chlorine (Cl_2) and Hydrochloric Acid (HCl) emissions at the scrubber outlet and system outlet of the PTI scrubber located at the NAS North Island, San Diego, CA. Phosgene emissions were determined by EPA Method TO-6 while Cl_2 and HCl emission were determined by EPA Method 26A. The scrubber was operated at normal conditions during the test. The source test was performed on February 2, 1998, and the results are listed in Table 3.0.

2.0 Introduction

The following test methods were used:

TABLE 2.0
Sampling Methodology

Parameter	Sampling Method
Phosgene	EPA Method TO-6
Cl_2 and HCl	EPA Method 26A
Moisture	CARB Method 4.1
Volume Flow Rate	CARB Method 2.1 and 3.1

All raw data was reduced and used to calculate the final results listed in Section 3. The calculations were performed using computer programs that have undergone quality control inspections before usage. The detailed results (computer generated spreadsheet data) are provided in Appendix A. Laboratory results and quality assurance documentation are provided in Appendix B and C, respectively.

The test methodologies are discussed in Section 5.0.

The testing was performed by Mr. Neal P. Conroy - Project Scientist from SCEC and Mr. Robert Leyva - Technician from SCEC.

3.0 Summary of Results

The test results are summarized in Table 3.0.

3.0 Summary of Results (Continued)

TABLE 3.0
Test Results Summary

PTI Scrubber

Naval Air Station, North Island, San Diego, CA

02/02/98

SCEC Project No.: 29822

Parameter		Scrubber Outlet	System Outlet
TEST CONDITIONS:		Normal Conditions	Normal Conditions
PHOSGENE: *EPA Method TO-6*	*ppbv*	1472.7	23.8
CHLORINE: *EPA Method 26A*	*ppbv*	7.4	0.04
HYDROCHLORIC ACID: *EPA Method 26A*	*ppbv*	22.1	0.18
VOLUME FLOW: *EPA Method 26A*	*DSCFM*		310
% ISOKINETIC: *EPA Method 26A*	*% Isokinetic*		105

4.0 Discussion of Results

The system outlet samples were collected at a fixed-point halfway into the 6-inch sampling duct. The scrubber outlet samples were collected by attaching Teflon probes to 1/4-inch taps in the duct.

5.0 Sampling and Analytical Procedures

5.1 EPA Method TO-6 - Phosgene Emissions

<u>Introduction</u>

The source air was drawn through a micro-impinger sampling train charged with a solution of aniline in toluene to determine phosgene emissions. After sampling, the aniline solution was then analyzed for phosgene by High Performance Liquid Chromatograph (HPLC).

<u>Sample Preparation</u>

Prior to sampling all glassware was rinsed with methanol. 5ml of the aniline solution were placed in the first and second impinger, the third impinger was left empty, and the fourth impinger was filled with approximately 25 grams of silica gel.

<u>Sampling Procedure</u>

The apparatus consisted of a open-end Teflon probe followed by a series of micro impingers connected in tandem and immersed in an ice bath. The absorption train was followed by a vacuum pump, dry gas meter, and a calibrated restriction orifice fitted with a manometer.

The sampling rate was set between 500-1000 ml/minute. On completion of the sampling, the apparatus was removed from the stack, leak checked, and transported to the laboratory.

A reagent blank was prepared and analyzed for phosgene.

The source emissions in ppmv were calculated using the following equation:

$$\text{ppbv} = \frac{(\text{ug/sample})(\text{g}/10^6\ \text{ug})(0.849\ \text{cf/gmole})(1/\text{MW[g/gmole]})}{\text{Sample Volume}} \cdot 10^9$$

5.0 Sampling and Analytical Procedures (Continued)

5.2 CARB Methods 2.1 to 4.1 - Exhaust Flow and Moisture

CARB Method 2.1 - Velocity and Volumetric Flow Rate

The velocity of the gas stream was determined by using an "S" type pitot tube, an inclined manometer and type "K" thermocouple with a digital temperature measuring device. The calibrated pitot tube was connected to the manometer and leak checked. A temperature and velocity pressure (delta P) was obtained at each traverse point, and a duct static pressure was measured and recorded. The dry volumetric flow rate was determined from the gas velocity data, stack pressure, stack gas moisture content, stack gas molecular weight, and cross-sectional area of duct.

CARB Method 3.1 - Gas Analysis for Dry Molecular Weight and Excess Air

The scrubber system was at ambient conditions. Therefore, values of 20.9% and 0.0% for oxygen and carbon dioxide were utilized to determine molecular weight.

CARB Method 4.1 - Determination of Moisture Content in Stack Gases

Moisture content was determined concurrently with the EPA Method 26A sampling run. After sampling, the final weights of each impinger were determined and recorded. Percent moisture content was calculated from the weight of water collected and the dry gas volume sampled.

Calculations

$$\text{Moisture } (B_w) = \frac{\text{Vwstd}}{\text{Vmstd} + \text{Vwstd}} \times 100$$

Where: $\text{Vwstd} = 0.0000894 * \text{Tstd} * \text{Vol } H_2O \text{ Collected (ml)}$

$$\text{Vmstd} = \text{Y Meter} * \frac{528°R}{29.92 \text{ in Hg}} * \frac{\text{Vol Metered}}{\text{Temp. Meter}} * \text{Pres. Meter}$$

5.0 Sampling and Analytical Procedures (Continued)

5.3 EPA Method 26A - Cl_2 and HCl Emissions

Introduction

The Method 26A sampling train was used to extract gas phase Hydrochloric Acid, and Chlorine emissions. The extract was analyzed for chloride ions by ion chromatography and quantified by reference to external standards or other suitable analytical method.

Sample Preparation

Nozzle, probe, filter holder, and impingers were rinsed with deionized water. 100ml of impinger solution (0.1 N H_2SO_4) was placed in the first and the second impinger, the third and fourth impinger were each charged with 100 ml 0.1 N NaOH. The fifth impinger was filled with approximately 400g of silica gel.

Sampling Procedure

The apparatus consisted of a nozzle, quartz probe and heated filter holder followed by a series of impinger/absorbers connected in tandem and immersed in an ice bath. The absorption train was followed by a vacuum pump, dry gas meter, and a calibrated restriction orifice fitted with a manometer.

The apparatus was leak tested, the filter temperature brought to temperature, and the nozzle was positioned at the first sampling point. The pump was immediately started and adjusted to obtain the isokinetic sampling rate.

Duct conditions were monitored throughout the sampling period with a type "S" pitot tube and a type "K" thermocouple simultaneously positioned at each traverse point. Conditions at the sampling apparatus and metering device were constantly monitored and regularly recorded on the data sheet.

On completion of the sampling, the apparatus was removed from the stack, leak checked, and transported to the laboratory.

The impinger contents were recovered into separate containers and transported to the laboratory for subsequent analysis.

APPENDIX F
REAGENT PANEL TCLP ANALYSIS RESULTS

<u>**Contents:**</u>

Reagent Panel Analysis Summary Results
Analytical Data Sheets

Reagent Panel Analysis Summary Results
Toxicity Characteristic Leaching Procedure (TCLP) for Volatile Organic Compounds (VOCs)

Compound	Regulatory Limit (ppm)	Maximum Level Found in Reagent Panels (ppm)
Benzene	0.50	n.d.
2-Butanone (MEK)	200	0.460
Carbon tetrachloride	0.50	0.260
Chlorobenzene	100	n.d.
Chloroform	6.0	1.100
1,2-Dichloroethane	0.50	0.022
1,1-Dichloroethylene	0.70	0.054
Tetrachloroethylene	0.70	0.100
Trichloroethylene	0.50	0.083
Vinyl chloride	0.20	n.d.

n.d. = not detected

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

130679MSD05

Lab Name: QUANTERRA MO Contract: 248.56

Lab Code: ITMO Case No.: SAS No.: SDG No.: 16949

Matrix: (soil/water) WATER Lab Sample ID: 16949-004

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: ESMP0943

Level: (low/med) LOW Date Received: 02/14/98

% Moisture: not dec. ______ Date Analyzed: 02/17/98

Column: (pack/cap) CAP Dilution Factor: 10.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
75-01-4	Vinyl Chloride	140	
75-35-4	1,1-Dichloroethene	250	
67-66-3	Chloroform	920	
107-06-2	1,2-Dichloroethane	220	
78-93-3	2-Butanone	720	
56-23-5	Carbon Tetrachloride	420	
79-01-6	Trichloroethene	240	
71-43-2	Benzene	210	
127-18-4	Tetrachloroethene	200	
108-90-7	Chlorobenzene	210	

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

13067906 RE

Lab Name: QUANTERRA MO Contract: 248.56

Lab Code: ITMO Case No.: SAS No.: SDG No.: 16949

Matrix: (soil/water) WATER Lab Sample ID: 16949-005

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: ESMP0944

Level: (low/med) LOW Date Received: 02/14/98

% Moisture: not dec. ______ Date Analyzed: 02/17/98

Column: (pack/cap) CAP Dilution Factor: 10.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
75-01-4	Vinyl Chloride	100	U
75-35-4	1,1-Dichloroethene	51	
67-66-3	Chloroform	1100	
107-06-2	1,2-Dichloroethane	50	U
78-93-3	2-Butanone	480	
56-23-5	Carbon Tetrachloride	290	
79-01-6	Trichloroethene	77	
71-43-2	Benzene	50	U
127-18-4	Tetrachloroethene	93	
108-90-7	Chlorobenzene	50	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

13067906

Lab Name: QUANTERRA MO Contract: 248.56

Lab Code: ITMO Case No.: SAS No.: SDG No.: 16949

Matrix: (soil/water) WATER Lab Sample ID: 16949-005

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: BSMP1443

Level: (low/med) LOW Date Received: 02/14/98

% Moisture: not dec. ________ Date Analyzed: 02/17/98

Column: (pack/cap) CAP Dilution Factor: 10.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
75-01-4	Vinyl Chloride	12	J
75-35-4	1,1-Dichloroethene	54	
67-66-3	Chloroform	1100	
107-06-2	1,2-Dichloroethane	22	J
78-93-3	2-Butanone	460	
56-23-5	Carbon Tetrachloride	260	
79-01-6	Trichloroethene	83	
71-43-2	Benzene	50	U
127-18-4	Tetrachloroethene	100	
108-90-7	Chlorobenzene	50	U

EPA SAMPLE NO.

13067905

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: QUANTERRA MO Contract: 248.56

Lab Code: ITMO Case No.: SAS No.: SDG No.: 16949

Matrix: (soil/water) WATER Lab Sample ID: 16949-002

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: ESMP0941

Level: (low/med) LOW Date Received: 02/14/98

% Moisture: not dec. ______ Date Analyzed: 02/17/98

Column: (pack/cap) CAP Dilution Factor: 10.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
75-01-4	Vinyl Chloride	100	U
75-35-4	1,1-Dichloroethene	29	J
67-66-3	Chloroform	700	
107-06-2	1,2-Dichloroethane	50	U
78-93-3	2-Butanone	280	
56-23-5	Carbon Tetrachloride	230	
79-01-6	Trichloroethene	57	
71-43-2	Benzene	50	U
127-18-4	Tetrachloroethene	60	
108-90-7	Chlorobenzene	50	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

130679MS05

Lab Name: QUANTERRA MO Contract: 248.56

Lab Code: ITMO Case No.: SAS No.: SDG No.: 16949

Matrix: (soil/water) WATER Lab Sample ID: 16949-003

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: ESMP0942

Level: (low/med) LOW Date Received: 02/14/98

% Moisture: not dec. ______ Date Analyzed: 02/17/98

Column: (pack/cap) CAP Dilution Factor: 10.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
75-01-4	Vinyl Chloride	150	
75-35-4	1,1-Dichloroethene	270	
67-66-3	Chloroform	960	
107-06-2	1,2-Dichloroethane	230	
78-93-3	2-Butanone	660	
56-23-5	Carbon Tetrachloride	460	
79-01-6	Trichloroethene	260	
71-43-2	Benzene	220	
127-18-4	Tetrachloroethene	210	
108-90-7	Chlorobenzene	220	

1A

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

0212982

Lab Name: QUANTERRA MO Contract: 248.56

Lab Code: ITMO Case No.: SAS No.: SDG No.: 16949

Matrix: (soil/water) WATER Lab Sample ID: 16949-001

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: BSMP1439

Level: (low/med) LOW Date Received: 02/14/98

% Moisture: not dec. ______ Date Analyzed: 02/16/98

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
75-01-4	Vinyl Chloride	10	U
75-35-4	1,1-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	4	J
56-23-5	Carbon Tetrachloride	5	U
79-01-6	Trichloroethene	5	U
71-43-2	Benzene	5	U
127-18-4	Tetrachloroethene	5	U
108-90-7	Chlorobenzene	5	U

APPENDIX G
LIQUID CONDENSATE ANALYSIS RESULTS

Contents:
Analytical Data Sheets

STD-Volatile Organics, EPA 8260

Method 8260

PRELIMINARY RESULTS

Client Name: Process Technologies
Client ID: PT-I-020598-R-235
Lab ID: 097433-0006-SA
Matrix: AQUEOUS Sampled: 05 FEB 98 Received: 09 FEB 98
Authorized: 09 FEB 98 Prepared: NA Analyzed: 19 FEB 98

Parameter	Result	Units	Reporting Limit	
Dichlorodifluoromethane (Freon 12)	ND	ug/L	25000	o
Chloromethane	ND	ug/L	25000	
Vinyl chloride	ND	ug/L	25000	
Bromomethane	ND	ug/L	25000	
Chloroethane	ND	ug/L	25000	
Trichlorofluoromethane (Freon 11)	ND	ug/L	25000	
1,1-Dichloroethene	ND	ug/L	25000	
Methylene chloride	ND	ug/L	25000	
trans-1,2-Dichloroethene	ND	ug/L	25000	
1,1-Dichloroethane	ND	ug/L	25000	
2,2-Dichloropropane	ND	ug/L	25000	
cis-1,2-Dichloroethene	300000	ug/L	25000	
Chloroform	ND	ug/L	25000	
Bromochloromethane	ND	ug/L	25000	
1,1,1-Trichloroethane	ND	ug/L	25000	
1,1-Dichloropropene	ND	ug/L	25000	
Carbon tetrachloride	ND	ug/L	25000	
1,2-Dichloroethane	ND	ug/L	25000	
Benzene	ND	ug/L	25000	
Trichloroethene	110000	ug/L	25000	
1,2-Dichloropropane	ND	ug/L	25000	
Bromodichloromethane	ND	ug/L	25000	
Dibromomethane	ND	ug/L	25000	
Toluene	32000	ug/L	25000	
1,1,2-Trichloroethane	ND	ug/L	25000	
1,2-Dibromoethane (EDB)	ND	ug/L	25000	
1,3-Dichloropropane	ND	ug/L	25000	
Tetrachloroethene	52000	ug/L	25000	
Dibromochloromethane	ND	ug/L	25000	
Chlorobenzene	ND	ug/L	25000	
1,1,1,2-Tetrachloroethane	ND	ug/L	25000	
Ethylbenzene	ND	ug/L	25000	
Xylenes (total)	ND	ug/L	25000	
Styrene	ND	ug/L	25000	
Bromoform	ND	ug/L	25000	
Isopropylbenzene (1-Methylethylbenzene)	ND	ug/L	25000	
1,1,2,2-Tetrachloroethane	ND	ug/L	25000	
1,2,3-Trichloropropane	ND	ug/L	25000	
n-Propyl benzene	ND	ug/L	25000	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Michael Lucchesi Approved By: Karin Yee

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STD-Volatile Organics, EPA 8260

PRELIMINARY RESULTS

Method 8260

Client Name: Process Technologies
Client ID: PT-I-020598-R-235
Lab ID: 097433-0006-SA
Matrix: AQUEOUS Sampled: 05 FEB 98 Received: 09 FEB 98
Authorized: 09 FEB 98 Prepared: NA Analyzed: 19 FEB 98

Parameter	Result	Units	Reporting Limit
Bromobenzene	ND	ug/L	25000
1,3,5-Trimethylbenzene	ND	ug/L	25000
2-Chlorotoluene	ND	ug/L	25000
4-Chlorotoluene	ND	ug/L	25000
tert-Butylbenzene	ND	ug/L	25000
1,2,4-Trimethylbenzene	ND	ug/L	25000
sec-Butylbenzene	ND	ug/L	25000
p-Cymene	ND	ug/L	25000
1,3-Dichlorobenzene	ND	ug/L	25000
1,4-Dichlorobenzene	ND	ug/L	25000
n-Butylbenzene	ND	ug/L	25000
1,2-Dichlorobenzene	ND	ug/L	25000
1,2-Dibromo-3-chloropropane (DBCP)	ND	ug/L	25000
1,2,4-Trichlorobenzene	ND	ug/L	25000
Hexachlorobutadiene	ND	ug/L	25000
Naphthalene	ND	ug/L	25000
1,2,3-Trichlorobenzene	ND	ug/L	25000

Surrogate	Recovery	
1,2-Dichloroethane-d4	94	%
Toluene-d8	95	%
4-Bromofluorobenzene	82	%

Note o : Reporting limit(s) raised due to high level of analyte present in sample.

ND = Not detected
NA = Not applicable

Reported By: Michael Lucchesi Approved By: Karin Yee

The cover letter is an integral part of this report.
Rev 230787

APPENDIX H
SCRUBBER LIQUID ANALYSIS RESULTS

Contents:

Analytical Data Sheets

GENERAL INORGANICS

(Water)

PRELIMINARY RESULTS

Client Name: Process Technologies
Client ID: PT-C1-020598-R-233C
Lab ID: 097433-0003-SA
Matrix: AQUEOUS
Authorized: 09 FEB 98

Sampled: 05 FEB 98
Prepared: See Below

Received: 09 FEB 98
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
pH	9.2	pH units	NA	150.1	NA	09 FEB 98
Solids, Total Dissolved	196000	mg/L	500	160.1	NA	12 FEB 98 o
Solids, Total Suspended	745	mg/L	5.0	160.2	NA	12 FEB 98

Note o : Reporting limit(s) raised due to high level of analyte present in sample.

ND = Not detected
NA = Not applicable

Reported By: Barry Marcks

Approved By: Josefina Jones

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Rev 230787

METALS

(Water - Total) PRELIMINARY RESULTS

Client Name: Process Technologies
Client ID: PT-C1-020598-R-233B
Lab ID: 097433-0002-SA
Matrix: AQUEOUS
Authorized: 09 FEB 98

Sampled: 05 FEB 98
Prepared: See Below

Received: 09 FEB 98
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Sodium	6720	mg/L	100	200.7 Modified	12 FEB 98	13 FEB 98 o

Note o : Reporting limit(s) raised due to high level of analyte present in sample.

ND = Not detected
NA = Not applicable

Reported By: Wennilyn Fua   Approved By: Barry Votaw

The cover letter is an integral part of this report.
Rev 230787

APPENDIX I
DATA QUALITY EVALUATION

Contents:

Review of Quality Assurance/Quality Control Data

Review of Quality Assurance/Quality Control (QA/QC) Data from the Demonstration of the PTI VOC Treatment Technology at NAS North Island Site 9

Overview

A review has been conducted on data collected for the PTI Technology Demonstration at NAS North Island Site 9, based in San Diego, CA. This report summarizes the results of the QA/QC data associated with analyses of VOCs, SVOCs, TNMOC, fixed gases, HCl, Chlorine, Phosgene, the TCLP, Total Suspended Solids and Total Dissolved Solids.

All samples were collected between October 24, 1997 and February 6, 1998. All samples were analyzed in accordance with U.S. EPA Test Methods, with the exception of carbon monoxide and methane which were analyzed using an ASTM Method (see Table 1).

Table 1 - Summary of Analyses

Matrix	Parameter	Analytical Method	Number of Samples
Gas	VOCs in Air	TO-14	67, 1 field duplicate, 1 field blank
	TNMOC	TO-12	67, 1 field duplicate, 1 field blank
	Carbon monoxide, Methane	ASTM-D1946	67, 1 field duplicate, 1 field blank
	PCBs/Pesticides/PAHs*	8080/ 8270	2
	HCl, Chlorine*	26A	2
	Phosgene*	TO-6	2
Liquid	VOCs - Scrubber Liquor, Condensate	8260A	1
	TSS,TDS	160.1, 160.2	1
Solid	TCLP	8260A	1

* Sampling and analysis by SCEC, see Appendix D.

All SUMMA canister samples (TO-14, TO-12, ASTM-D1946) were analyzed at Quanterra's City of Industry Laboratory. All other samples collected by PTI were

analyzed at various other Quanterra locations. Each laboratory provided analytical results and QA/QC information for all samples analyzed.

Data Usability Review

The intent of this review is to assess the appropriate use or "usability" of the analytical data collected during the technology demonstration based upon the QA/QC data provided by the laboratory. This review will focus on the following QA/QC parameters and the overall effect upon the data:

- Sample custody
- Holding times
- Calibration (initial and continuing)
- Method Blanks
- Laboratory control samples (LCS/LCSD)
- Field QA/QC
- Field FID Operation

1.0 Sample Custody

All samples were properly recorded and transfer of custody was documented on each chain-of-custody (COC) form.

2.0 Holding Times

Holding time criteria insure sample integrity is not compromised over time. The following indicates the number of days that passed between date of collection and analysis date. Holding times for individual analyses are listed in Table 2.

Table 2 - Sample Holding Times

Analysis Parameter	Sample Type	Maximum Holding Time	Actual Holding Time
VOCs	Canister	30 days	4 to 12 days
TNMOC	Canister	30 days	12 to 25[1] days
CO, Methane	Canister	30 days	4 to 12 days
PCBs, Pesticides, PAHs[2]	XAD-2 Cartridge	30 days to extraction; 45 days from extraction to analysis	4 days/ 5 days
HCl, Chlorine[2]	Impingers	28 days	7 days
Phosgene[2]	Impingers	30 days	7 days
VOCs - Scrubber Liquor, Condensate	Liquid	14 days	14 days
TSS, TDS	Liquid	7 days	4 days
TCLP	Leachate/ Extract	14 days to extraction; 14 days from extraction to analysis	7 days/ 3 days

Notes:

1. Eight samples collected November 17th and 18th were analyzed 25 days after collection due to instrument breakdown. All others were analyzed within 12 days.
2. Sampled by SCEC - see Appendix D for further details.

3.0 Calibration, Method Blanks, and Laboratory Control Samples

The following section summarizes these requirements for TO-14, TO-12, and ASTM-D1946, only. The calibration and QA/QC for all other methods will not be discussed due to the small number of samples collected. However, all analyses met the laboratories internal QA/QC requirements.

3.1 VOCs by Method TO-14 - SCAN

A) Calibration - Initial and Continuing

Canister samples were analyzed by Quanterra's Air Toxics Laboratory located in City of Industry, California. The samples will be analyzed using gas chromatography equipped with a Mass Selective Detector. An initial multipoint calibration was performed consisting of a system blank and a minimum a five point calibration. The lowest calibration point is at or near the reporting limit. A single point check standard was analyzed (every 12 hours), with 90% of the target compound response factors within 30%

of the five point calibration curve average response factors. Failure to meet these criteria results in a new 5 point calibration being run.

Deviations from the source method include:

1. Use of a 0.53 mm column instead of a 0.32 mm column, and a jet separator to reduce the flow into the HP MSD form 3 mL/min to 1 mL/min, which is the maximum flow that the HP system can handle. Quanterra uses the pressure of the sample canister to drive the sample through the trap, instead of the sample being pulled through the trap using a vacuum pump.

B) <u>Method Blank</u>

A method blank was analyzed every 12 hours before samples were run, the results of which must indicate no target compounds at levels above the reporting limits (RL). The method blank is prepared by adding humidified nitrogen to a canister, and analyzing it in the same manner as a sample. If any of the above criteria are not met, corrective actions must be taken before analyses can proceed.

C) <u>Laboratory Control Samples (LCS/LCSD)</u>

Laboratory Control Samples (LCS) are samples with known amounts of analyte which are carried through the entire analysis procedure. Since this sample should yield consistent results, anomalous results indicate a laboratory analytical problem, not a matrix problem. In addition, this sample will provide a limiting measure of accuracy. A laboratory control sample (LCS) will be analyzed every 20 samples or daily, which ever is more frequent and consists of methylene chloride, 1,1-dichloroethylene, trichloroethylene, toluene, and 1,1,2,2-tetrachloroethane, all at a nominal spike concentration of 50 ppb. The percent recovery for the compounds in the LCS must be within the window 60-130%. For each lot of 20 samples, a laboratory control sample duplicate (LCSD) must be analyzed. The LCSD is identical to the LCS and must meet the same recovery criteria. In addition the relative percent difference (RPD) between the LCS and the LCSD must be ≤ 20 %. If either control samples fail, the LCS which failed will be reanalyzed. Samples will not be considered reportable until the LCSD criteria are met. This LCS will be prepared in a canister using UHP nitrogen. Internal standards are monitored each 12 hour shift by comparing areas of the internal standards in each sample with the areas of the internal standards in the daily continuing calibration standard. Sample areas are considered acceptable if they fall between 50 and 150% of the daily standard areas.

3.2 Total Non-Methane Organic Carbon (TNMOC) by Method TO-12

A) Calibration - Initial and Continuing

The initial calibration consists of a five point calibration curve, each point being analyzed three times, with the relative standard deviation (RSD) ≤ 3% required for acceptance. Continuing calibration consists of two points analyzed once each with a required RPD ≤ 15% between the continuing and the initial calibration. Failure to meet these criteria will result in recalibration and reanalysis of the samples in that batch, prior to analysis of any additional samples. Each sample is analyzed twice with the relative percent difference (RPD) required to be ±5%, the average of the two analyses is reported. A RPD >5% will result in the sample being reanalyzed.

B) Method Blank

A method blank was run on a daily basis and was considered acceptable if less than the base reporting limit of 0.5 ppm-C.

C) Laboratory Control Samples (LCS/LCSD)

There are no LCS/LCSD for TO-12, however the samples are analyzed twice and the average value reported.

3.3 Carbon Monoxide and Methane by ASTM - D1946

A) Calibration - Initial and Continuing

Carbon monoxide and methane were determined using a multiple column GC method, with flame ionization detection (FID). An initial multipoint point calibration, after which a daily single point calibration check standard is analyzed. The check standard must was required to be within 15% of the most recent instrument calibration. If the check standard fails to meet this criterion, a second check standard is run. To be accepted this second check standard must be within 10 % of the first check standard. Failure to meet this criteria will result in recalibration prior to analysis of additional samples. The accepted check standard is used to calculate the concentration in the samples.

B) Method Blank

A method blank of hydrocarbon free air must be analyzed after the daily check standard. This results of this blank must indicate that there is no carbon monoxide or methane above the MDL (10 ppmv and 2 ppmv, respectively).

C) Laboratory Control Samples (LCS/LCSD)

For each lot of 20 samples analyzed, a laboratory control sample and control sample duplicate were run, which consists of a subset of the target compounds injected at a concentration that differs from that of the daily check standard. The acceptance criteria

for the LCS/LCSD pair is an RPD < 10%. The percent recovery for the target compounds must be within a window of 80-120%.

4.0 Field QA/QC

4.1 Field Duplicates

One field duplicate and field blank were collected for methods TO-14, TO-12 and ASTM-D1946. The frequency of field duplicate and field blank sampling events was set at 10% (approximately 6 sets). However due to an oversight by PTI only one set of field duplicate and blanks were collected, a frequency of only 1.5%. The results from the duplicate are summarized in Table 3. The field duplicate was a four hour composite collected simultaneously with the sample. This necessitated the use of an different vacuum flow regulator and introduced an additional variable. The RPD was within the guideline of ± 20%, with the exception of two compounds; toluene and *trans*-DCE, which were 28.4% and 23.1%, respectively. The TNMOC was also outside of the guideline of ± 20%.

4.2 Field Blanks

The field blank for the TO-14 analysis indicated that four compounds were detected; cis-DCE at 3 ppbv, TCE at 3 ppbv, Methylene chloride at 2 ppbv, and PCE at 2 ppbv. The base reporting limit for these compounds by TO-14 is 2 ppbv. The TO-12 analysis indicated not detected, as did the analysis for carbon monoxide and methane (ASTM-D1946). These results seem to indicate that carry-over from sampling equipment was not a significant problem.

Since only one set of duplicate and blank samples were collected it is not possible to evaluate field sampling technique.

Table 3 - Field Duplicate

Compound	Sample Result (ppmv) PT-B-020598-R-227	Duplicate Result (ppmv) PT-B-020698-D-232	Relative Percent Difference (RPD)
cis-DCE	1.20	1.18	1.7
TCE	1.63	1.51	7.6
Toluene	0.53	0.71	28.4
PCE	1.50	1.82	19.3
Xylenes	<0.021	0.031	NC*
Methylene chloride	0.091	0.095	4.3
Chloroform	0.259	0.289	10.9
trans-DCE	0.046	0.058	23.1
Benzene	0.078	0.093	17.5
Acetone	0.291	0.327	11.6
TNMOC	34	24	34.4
Carbon monoxide	52	52	0
Methane	4.5	<4.4	NC*

* NC: not calculable

Completeness

Completeness criteria monitor the percentage of measurements judged to be valid compared to the expected total number of measurements. The overall completeness objective for acceptable analytical data for this project was set at 90 percent. The completeness objective of 90 percent based on precision and accuracy was met for all analyses.

5.0 Field FID Operation

During this project PTI operated two flame ionization detectors (FID) used to record the total hydrocarbons removed by the PTI system. The following is the procedure followed by PTI personnel to operate the FID units. The data from the FIDs was recorded using a data logger.

Initial Startup

1) Connect power cord
    a) Press buttons for Heater, Amplifier, and Temperature - Display will show oven temperature – Let system heat up for 12 hours, **3-4 hours minimum.**

2) Connect gases at rear of FID
   a) Hydrogen (Fuel) - 21 psi max.
   b) Purge and Zero Air (both supplied from the air compressor) - 15 psi max.
   c) Span (calibration) gas - 15 psi max. - make sure that valve on flow regulator is **closed** when not calibrating. Since we have a flow regulator there is no pressure adjustment necessary.

3) Turn on pump, set Mode to zero gas (front panel).

4) Ignite flame - press ignite button for no more than 2 seconds, repeat until FID is lit - as indicated by red light next to ignite button changing to green. <u>FID should be allowed to stabilize for 3-4 hours prior to attempting to calibrate.</u>

Calibration /Zeroing Instrument

With the FID lit, and instrument display set to read output - Temperature button off (no green light next Temp button). ***Calibration and Zeroing should be done daily***, with zero and span pot settings recorded in logbook.

1) Switch to Zero gas mode
   a) Adjust zero pot so that display reads zero. This should be done on the <u>lowest range to be used</u> for sample measurements. See instrument manual for range values.

1) Switch to span gas mode
   a) Adjust span using span pot. Example: If range is set to 0-1000, and a 1000 ppm span (calibration) gas is being used, display should read 10.00. NOTE: Any reading greater than 10.00 on the display indicates an out of range condition.
   b) Switch back to Zero gas mode, close span gas valve.

The instrument is now ready to take data. Connect heated sample line to back panel of instrument, open valve at sample source. Switch mode to sample position.

If the FID must be shut down, close sample valve and disconnect sample line. ***Under no circumstances should the FID be left connected to the heated sample line without having the flame lit and the oven heater on.***

6.0 References

Table 4 - Preparation And Analytical Methods For The PTI Demonstration

Parameter	Preparation Method	Analytical Method	Reference(s)
TMNOC	NA	TO-12[1]	2
VOCs	NA	TO-14 - SCAN[1]	2
HCl, chlorine	NA	EPA 26	3
CO	NA	ASTM-D1946[1]	5
Phosgene	NA	TO-6	2
PCBs/Pesticides/ PAHs	CARB 429	EPA 8080, 8270	1
VOCs	NA	8260A	1
TDS	NA	160.1	4
TSS	NA	160.2	4
TCLP	1311	8240	1
VOCs	NA	8260A	1

Note:
1 The Quanterra Standard Operating Procedures (SOPs) for Methods TO-14 and TO-12 are confidential and cannot be included in this document. Sufficient detail has been presented to allow an appropriate review.

References Cited

(1) *Test Methods for Evaluating Solid Waste*, Volumes 1A-1C: Laboratory Manual, Physical/Chemical Methods; and Volume II: Field Manual, Physical/Chemical Methods, SW-846, Third Edition. Update IIB. Office of Solid Waste, U.S. Environmental Protection Agency, Document Control No. 955-001-00000-1, January , 1995.

(2) Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, EPA 600 / 4-84 / 041, April 1984.

(3) Code of Federal Regulations (CFR) 1997, Title 40, Part 60.

(4) U.S. Environmental Protection Agency (EPA). *Methods for Chemical Analysis of Water and Wastes*. Environmental Monitoring and Support Laboratory. Cincinnati, Ohio. EPA-600/4-79-020. March 1983.

(5) Standard Test Method for Total Hydrocarbons, Methane, and Carbon Monoxide in the Atmosphere (Gas Chromatographic Method), ASTM D3416-88, ASTM 1991 Vol. 11.03.